DUBLIN INSTITUTE of TECHNOLOGY
Institiúid Teicneolaíochta Bhaile Átha Cliath

FOCAS Research Institute

SAFETY STATEMENT

2014

Health & Safety
www.dit.ie/safework

Version	Date	Name
1	11-03-2014	Theresa Hedderman
		Health and Safety Officer

Table of Contents

FOCAS RESEARCH INSTITUTE EMERGENCY CONTACT DETAILS	**3**
INTRODUCTION	**6**
SAFETY RESPONSIBILITIES	**7**
DISCIPLINARY ACTION	**11**
HEALTH AND SAFETY CONSULTATION	**11**
PROVISION OF INFORMATION	**12**
RESOURCES	**12**
SAFE SYSTEMS OF WORK	**13**
PROCUREMENT CONTROL	**14**
INSPECTION PROCEDURES	**14**
TRAINING	**15**
EMERGENCY PLANNING AND RESPONSE	**16**
FIRST-AID	**20**
INCIDENT REPORTING AND INVESTIGATION	**20**
HAZARD REPORTING	**21**
MANAGEMENT OF CONTRACTORS/SERVICE PROVIDERS	**21**
PERSONAL PROTECTIVE EQUIPMENT (PPE)	**21**
ERGONOMICS	**22**
WELFARE PROVISIONS	**23**
SENSITIVE WORK GROUPS	**23**
LONE, OUT OF HOURS ACCESS	**24**
TRIPS/TRAVEL	**24**
STAFF/STUDENTS WITH DISABILITIES	**24**
HEALTH SURVEILLANCE	**24**

WORKPLACE DRUGS, INTOXICANTS AND ALCOHOL	**25**
DIGNITY AT WORK ANTI BULLYING AND HARASSMENT POLICY	**25**
STRESS	**25**
AUDIT, REVIEW AND COMMUNICATION	**25**
DOCUMENT CONTROL	**25**
HAZARD IDENTIFICATION, RISK ASSESSMENT AND CONTROL MEASURES	**26**
APPENDICES	**113**
APPENDIX 1 – FOCAS Research Institute Floor Plans	
APPENDIX 2 – FOCAS Research Institute SOP for Core Equipment	
APPENDIX 3 – FOCAS Research Institute Regular and Out of Hours Access	
APPENDIX 4 – FOCAS Research Institute Fire Safety Protocols	
APPENDIX 5 – FOCAS Research Institute Chemical and Biological Safety Protocols	
APPENDIX 6 – FOCAS Research Institute Field Work Risk Assessment	
APPENDIX 7 – FOCAS Research Institute Generic Health and Safety Forms	

FOCAS RESEARCH INSTITUTE CONTACT DETAILS

Role	Name	Location	Email	Telephone
Head of Function	Hugh J. Byrne	2.03.0	Hugh.Byrne@dit.ie	01 402 7900
Technical Officers	Theresa Hedderman	2.04.0	Theresa.Hedderman@dit.ie	01 402 7907
	Luke O'Neill	2.04.0	Luke.Oneill@dit.ie	01 402 7906
	Anne Shanahan	2.04.0	Anne.Shanahan@dit.ie	01 402 7905
	Andrew Hartnett	2.04.0	Andrew.Hartnett@dit.ie	01 402 7908
Administration	Damian Bruce	2..05.0	Damian.Bruce@dit.ie	01 402 7902
Nominated FOCAS Health and Safety Officer	Theresa Hedderman	2.04.0	Theresa.Hedderman@dit.ie	01 402 7907
Occupational First-aiders	Anne Shanahan	2.04.0	Anne.Shanahan@dit.ie	01 402 7905
	Damian Bruce	2.05.0	Damian.Bruce@dit.ie	01 402 7902

Please see FOCAS Research Institute Contacts for full listing

EMERGENCY CONTACT NUMBERS

Emergency Services	112/999 (You may need to dial "0" for an outside line)
Hospital	01 410 3000 St. James' Switchboard
Dublin City Council	01 222 22 22
Garda Síochána, Kevin Street	01 666 9400
Bord Gáis 24 hour emergency line	1850 20 50 50
ESB 24 hour emergency line	1850 372 999
Health and Safety Authority	1890 289 389
Samaritans	1850 60 90 90
Environmental Protection Agency	1890 33 55 99

CAMPUS CONTACT DETAILS

Core Staff	FOCAS	01 402 7900 / 01 402 7902/ 4027907/ 402 7905/ 402 7906
	Annexe	01 402 4612
	Kevin Street Main Building	01 402 4625
Incident Controller	Porter on Duty	01 402 4625
Building Service Supervisor	Jimmy Kane	01 402 4797
Building Maintenance Manager	Colm Gillen	01 402 4646 / 087 2888 294
Occupational Health Officer	Yvonne McArdle	01 402 4127 / 087 9809 135
Health and Safety Officer	Edel Niland	01 402 4192 / 086 3891 080
Student Health Centre	Reception	01 402 3051
Chaplain	Fionnuala Walsh	01 402 4568 / 086 8754 422
Employee Assistance Programme (EAP) Contact	VHI Corporate Solutions	Freephone 1800 995 955 (24 hours / 7 days a week / 365 days a year)
Student Counsellors	Nita Whelan / John Broderick	01 402 3052 / 01 402 3155
Nominated FOCAS Health and Safety Officer	Theresa Hedderman	01 4027907

The FOCAS Research Institute Health and Safety Committee (June 2014)

Head, FOCAS Research Institute	**Hugh J. Byrne**
Technical Support	**Theresa Hedderman**
Technical Support	**Anne Shanahan**
Technical Support	**Luke O Neill**
Industrial and Engineering Optics (IEO)	**Suzanne Martin**
Centre for Research and Engineering and Surface Technology (CREST)	**Swarna Jaiswal**
Material Synthesis and Analysis (MSA)	**Grainne Hargaden**
Radiation and Environmental Science Centre (RESC)	**Damien Trainer**
Nanolab	**Alan Casey**
Bio-spectroscopy	**Frank Bonnier**
Dublin Energy Labs	**Fintan McLoughlin**
CNRI	**Mark Davis**

LIST OF PERSONS IDENTIFIED AS BEING RESPONSIBLE FOR HEALTH AND SAFETY TASKS

TASKS	RESPONSIBLE PERSON	SIGNATURE
Coordinating and ensuring records are maintained for training and provision of Personal Protective Equipment	Prof. Hugh J. Byrne	Hugh Byrne
Ensuring Safety Statement, risk assessments are carried out, updated and communicated	Prof. Hugh J. Byrne	Hugh Byrne
Ensuring the upkeep of first-aid box and ordering first-aid supplies from Occupational Health Officer	Theresa Hedderman	Theresa Hedderman – Bane.
Co-ordinating contractors activities and dealing with Buildings Office for Work Permits	Prof. Hugh J. Byrne	Hugh Byrne
Updating the statutory registers and Safety Data Sheets	Prof. Hugh J. Byrne	Hugh Byrne
Ensuring adequate personnel designated as evacuation marshals and first-aiders	Prof. Hugh J. Byrne	Hugh Byrne

INTRODUCTION

Dublin Institute of Technology (DIT) is required under the provisions of the *Safety, Health and Welfare at Work Act 2005*, to have and bring to the attention of all employees, a statement of its policy, organisation and arrangements with respect to health, safety and welfare at work. The Act also embraces all of the activities at DIT and staff, students, visitors, contractors/service providers.

The fundamental aim of the *Safety, Health and Welfare at Work Act* is the prevention of accidents and illnesses at the place of work. Safety consultation procedures and the preparation of a Safety Statement and written risk assessment are the key provisions of the Act.

This Safety Statement has been prepared in compliance with the Act and provides details of the specific hazards relevant to the FOCAS Research Institute and the controls that have been implemented to adequately safeguard the activities.

This Safety Statement should be read in conjunction with the DIT Framework Safety Statement, which is available on the DIT Health and Safety website.

This document applies to all staff, students, visitors, contractors/service providers and users of the FOCAS Research Institute. It will be updated as necessary in the light of new legislation, staff feedback, changes and practical experience. In addition, it will be reviewed annually.

SAFETY POLICY & OBJECTIVE FOR THE FOCAS RESEARCH INSTITUTE

The FOCAS Research Institute will ensure that:

- Work activities are managed and conducted in a manner that ensures the safety, health and welfare of our employees, students, visitors and contractors/service providers
- Our Safety Statement is maintained and updated and written risk assessments are carried out and reviewed as required and brought to the attention of all employees at least annually
- Identified protective and preventative measures are implemented and maintained
- Improper conduct likely to put an employee, student, visitor or contractor/service provider's safety and health at risk is prevented in so far as is reasonably practicable
- A safe place of work is provided that is adequately designed and maintained
- A safe means of access and egress is provided
- Safe plant and equipment are provided
- Safe systems of work are provided
- Risks to health from any article or substance are minimised
- Appropriate information, instruction, training and supervision are provided
- Where hazards cannot be eliminated suitable protective clothing and equipment are provided
- Emergency plans are prepared and revised
- Welfare facilities are provided and adequately maintained
- Competent personnel who can advise and assist in securing the safety, health and welfare of employees are employed when required

Signed:
Head, FOCAS Research Institute, Prof. Hugh J. Byrne: **Date:** 1/07/2014

SCOPE OF SAFETY STATEMENT & HISTORY OF LOCATION

The FOCAS Research Institute has a total of 6 core staff members, 1 Head, 4 Technical staff and 1 Administrative staff. Additionally, approximately 35 research staff members and 95 postgraduate students occupy the FOCAS Research Institute on a full time basis. FOCAS also facilitates visiting researchers and project students, from DIT, nationally and internationally.

The FOCAS Research Institute, opened in November 2004, aims to facilitate and support scientific research within DIT. Collaborative projects with industry, State scientific bodies, research organisations and other universities are an important part of the FOCAS Research Institute's research activities. The research topics cover many aspects of modern science and engineering, such as pharmacology, biotechnology, nanotechnology and analytical and range from fundamental, curiosity-driven exploration to applied and industrially motivated research.

The FOCAS Research Institute supports higher degrees such as postgraduate diplomas (PgDip), Masters of Philosophy (MPhil) and Doctorates of Philosophy (PhD). It also supports undergraduate projects at level 7 and level 8.

SAFETY RESPONSIBILITIES

In accordance with the DIT Framework Safety Statement, the Head of the FOCAS Research Institute, Prof. Hugh J. Byrne, as part of his management function, is responsible for ensuring, in so far as is reasonably practicable, the health and safety of persons working, studying or visiting his area of responsibility. In particular he is responsible for the following:

1. To ensure a Safety Statement relevant to operations is prepared which complies with Section 20 of the Safety, Health and Welfare at Work Act 2005.
2. To ensure that the Safety Statement is reviewed at least annually and that the DIT Senior Leadership Team (SLT) Health and Safety Sub-committee is notified that the review has been completed and is provided with any updated document which may result from such a review
3. To ensure that all hazards are identified and risks controlled
4. To ensure that regular safety inspections/audits are carried out to monitor compliance with the Safety Statement and legal requirements and to ensure appropriate follow-up action is taken
5. To investigate all accidents to staff/students/visitors in their area of responsibility and to complete the Incident Report Form as appropriate
6. To ensure that local emergency plans and first-aid procedures are implemented and that sufficient evacuation marshals/first-aid personnel are available
7. To ensure that staff are appropriately trained to carry out their duties safely and to ensure the attendance of staff at designated training courses as appropriate
8. To ensure that all contractors/service providers carrying out work in the area operate under the Buildings Office 'Permit to Work' system
9. Based on the risk assessment, to arrange for the provision of adequate and appropriate personal protective equipment for employees

All Institute Personnel
All personnel have a duty to take responsibility for their own safety, health & welfare and for that of visitors and any other person who may be affected by their acts or omissions while at work.

Statutory Requirement

Chapter 2, Sections 13 & 14 of the Safety Health and Welfare at Work Act 2005 places a number of obligations on employees whilst at work as outlined in this section:

13.—(1) An employee shall, while at work—
(*a*) comply with the relevant statutory provisions, as appropriate, and take reasonable care to protect his or her safety, health and welfare and the safety, health and welfare of any other person who may be affected by the employee's acts or omissions at work,
(*b*) ensure that he or she is not under the influence of an intoxicant to the extent that he or she is in such a state as to endanger his or her own safety, health or welfare at work or that of any other person,
(*c*) if reasonably required by his or her employer, submit to any appropriate, reasonable and proportionate tests for intoxicants by, or under the supervision of, a registered medical practitioner who is a competent person, as may be prescribed,
(*d*) co-operate with his or her employer or any other person so far as is necessary to enable his or her employer or the other person to comply with the relevant statutory provisions, as appropriate,
(*e*) not engage in improper conduct or other behaviour that is likely to endanger his or her own safety, health and welfare at work or that of any other person,
(*f*) attend such training and, as appropriate, undergo such assessment as may reasonably be required by his or her employer or as may be prescribed relating to safety, health and welfare at work or relating to the work carried out by the employee,
(*g*) having regard to his or her training and the instructions given by his or her employer, make correct use of any article or substance provided for use by the employee at work or for the protection of his or her safety, health and welfare at work, including protective clothing or equipment,
(*h*) report to his or her employer or to any other appropriate person, as soon as practicable—
(i) any work being carried on, or likely to be carried on, in a manner which may endanger the safety, health or welfare at work of the employee or that of any other person,
(ii) any defect in the place of work, the systems of work, any article or substance which might endanger the safety, health or welfare at work of the employee or that of any other person, or
(iii) any contravention of the relevant statutory provisions which may endanger the safety, health and welfare at work of the employee or that of any other person, of which he or she is aware.

(2) An employee shall not, on entering into a contract of employment, misrepresent himself or herself to an employer with regard to the level of training as may be prescribed under *subsection (1)(f)*.

14.—A person shall not intentionally, recklessly or without reasonable cause—
(*a*) interfere with, misuse or damage anything provided under the relevant statutory provisions or otherwise for securing the safety, health and welfare of persons at work, or
(*b*) place at risk the safety, health or welfare of persons in connection with work activities

In addition, staff have the following responsibilities:

- To participate in and put into practice all training provided by DIT, to ensure compliance with safety, health & welfare legislation

- To co-operate with those responsible for health and safety
- To familiarise themselves with the contents of the Health and Safety Statement, safety policies and procedures and Codes of Practice
- To assist in the preparation and updating of the FOCAS Research Institute Safety Statements
- To assist and co-operate with periodic safety inspections/audits
- To assist in the completion of standard hazard identification control sheets and co-operate with the reporting and investigation of incidents
- To ensure that equipment is operated in a safe manner and good housekeeping standards are maintained at all times
- To promote safe work practices
- To ensure that all safety rules are communicated to students, contractors and visitors, other campus users
- To use equipment only if authorised and trained
- To ensure that any safety measures associated with new equipment/machinery is brought to the attention of the Head of the FOCAS Research Institute, Prof. Hugh J. Byrne
- To ensure that they do not carry out repairs or servicing on plant/equipment/machinery unless they are trained to do so, it is isolated and they should ensure that any guards removed to carry out repairs are properly replaced
- To wear appropriate personal protective equipment where required
- To report to the Head of the FOCAS Research Institute, Prof. Hugh J. Byrne any person abusing facilities or equipment
- To select and appoint a Safety Representative
- To notify the Health & Safety Officer of any perceived shortcomings in the safety arrangements
- To comply with policies and procedures from the Buildings Office e.g. in relation to use of domestic appliances

Supervisors/Laboratory co-ordinators

Each Core and Group Laboratory is designated a laboratory Co-ordinator for the purpose of general management and ensuring in as much as possible that H&S procedures are appropriately implemented.

It is the responsibility of all supervisors/Laboratory co-ordinators to ensure all personnel have completed a risk assessment covering their project prior to commencing work at the FOCAS Research Institute. The risk assessment should cover all activities and should be reviewed as required, and at least on an annual basis. A copy of the risk assessment should be available for inspection at all times. It is the responsibility of the supervisor/laboratory co-ordinator to supervise the undergraduate/visitors/postgraduate students while on premises and to ensure proper training on all instruments is provided.

Undergraduate/Visiting/Postgraduate Students

All personnel resident in the FOCAS Research Institute for a period of more than 3 months are considered as FOCAS Personnel. All FOCAS personnel are required to undertake the mandatory Health & Safety training in First Aid, Emergency Response and Manual Handling

Personnel have a legal responsibility not to endanger themselves or others by their acts or omissions. Thus they must:

- Take reasonable care of their own safety and the safety of others
- Co-operate fully with all safety rules and regulations issued by DIT e.g. smoking etc.
- Co-operate with those with responsibility for health and safety
- Not interfere or misuse any specified items of safety equipment or any safety device
- Ensure that equipment is operated in a safe manner and good housekeeping standards are maintained
- Use personal protective equipment (PPE) as necessary. (Students are required to provide their own PPE – laboratory coat, safety glasses etc.)
- Not access or use laboratory/workshop facilities and equipment without the permission of their academic supervisor and where necessary the staff member in charge of these facilities
- Use equipment only if authorised and properly trained
- Report any incident, dangerous occurrence, defective equipment or potential safety hazard to the Head of the FOCAS Research Institute, Prof. Hugh J. Byrne
- Only undertake work in laboratories that has been risk assessed in conjunction with their supervisor and signed off

Contractors/Service Providers

The following responsibilities are allocated to contractors/service providers:

- All contractors/service providers will be expected to comply with the DIT Policy for safety health and welfare and must ensure that their own Safety Statement is made available whilst work is being carried out. It is the Institutes policy that all contractor/service providers have a Safety Statement in accordance with the *Safety, Health and Welfare at Work Act 2005*
- All work must be carried out in accordance with relevant statutory provisions and taking into account the safety of others on the site. The contractor/service provider must have adequate insurance cover
- Contractors/service providers must not commence with any work on the premises or project site until the Contractor Safety Guidelines and other relevant safety procedures are read, understood and accepted (available from Buildings Office). They must complete the e-learning programme for contractors/service providers
- Contractors/service providers will take reasonable care of themselves and others who may be affected by their acts or omissions and will co-operate as appropriate with DIT employees as necessary
- Contractors/service providers must supply at tender stage a Safety Statement, relevant method statements, copies of their public and employers liability insurance and complete the Contractors Compliance Form CCF1 before a contract is awarded
- They will liaise with the local Building Maintenance Manager and obtain work permits as required
- Scaffolding and other access equipment used by contractor's/service provider's employees must be erected and maintained in accordance with current legislation and Codes of Practice
- All plant and equipment brought onto the site by contractors/service providers must be safe and in good working order, fitted with any necessary guards and safety devices and have all necessary certificates available for inspection
- All transformers, generators, extension leads, plugs and sockets must be suitable for industrial use and in good condition. No power tools or electrical equipment of greater than 110 volts should be used outdoors. If it is necessary to use equipment operating from a 220-volt supply, a residual current device with a rated tripping current of 30mA and operation of 30m sec must be used

- Any injury sustained by a contractor's/service provider's employee must be reported immediately to the local Building Maintenance Manager
- Contractors/service providers must comply with any safety instructions given by DIT
- DIT may carry out safety inspections. Contractors/service providers informed of any hazards or defects identified during these inspections will be expected to take immediate action
- DIT must be notified of any material or substance brought onto the site which has health, fire or explosive risks. Such materials must be stored and used in accordance with current recommendations
- Contractors/service providers will be accountable for the maintenance of good housekeeping practices at all times within their respective areas of work
- Contractors/service providers are not allowed to use equipment owned by the Institute unless written permission is received from the Head of School and a competent person passes it as being safe
- Contractors/service providers must wear PPE as appropriate/prescribed

Visitors (a person other than an employee or contractor/service provider)

- Visitors may not be aware of the potential hazards associated with DIT and also may lack familiarity with the Institute's premises/facilities and are therefore a potential risk to themselves and others. All visitors must identify themselves to the relevant DIT personnel and follow all DIT's safety procedures and policies
- Visitors must not enter any area where they do not have the authority to do so. Hazardous areas will be restricted
- They must not interfere with any of the Institutes property, equipment, materials or substances unless they have permission to do so from the person in charge
- They must not remain on the premises any longer than necessary and should return PPE on leaving
- In the event of an evacuation, they will be led to the Assembly Point by their DIT host
- The DIT Framework Safety Statement is available on the safety website www.dit.ie/safework
- DIT has a Child Protection Policy available on the DIT website

DISCIPLINARY ACTION

Any member of staff/student who contravenes or fails to manage to work in accordance with current safety health and welfare legislation, the DIT Framework Safety Statement and codes of practice may be subject to the Institute's disciplinary procedures. The Buildings Officer will address any contraventions by contractors/service providers.

HEALTH AND SAFETY CONSULTATION

Employers are obliged under The Safety, Health and Welfare at Work Act 2005, to consult with and take account of any representations made by employees regarding health, safety and welfare. The FOCAS Research Institute ensures that health and safety is a standing agenda item at FOCAS Leadership Team meetings. The FOCAS Research Institute has selected and appointed Safety Representatives of units housed. Details of current Safety Representatives may be found on the health and safety website (www.dit.ie/safework) The FOCAS Health and Safety Team, chaired by the Head of FOCAS, comprises representation from all units housed within FOCAS, conducts laboratory H&S audits and meets quarterly to deal with certain health and safety items if required.

The Head of FOCAS, or nominee, is a member of the Directorate of Research, Enterprise and Innovation (DREI) Health and Safety Committee. The Head of FOCAS, or nominee, sits as an ad hoc member of the College of Sciences & Health, Health and Safety Team. This team meets periodically throughout the year, usually every two months.

Consultation takes place when there is a change, update or modification to a particular work process, when new machines or processes are introduced or when new substances or materials are introduced.

PROVISION OF INFORMATION

Personnel are made aware of safety matters by the following means:

- Agenda item at Team/Function meeting
- Desktop Emergency Response Flip charts
- Health & Safety notice boards
- Health & Safety Newsletters
- Toolbox talks
- Health & Safety Induction
- Health & Safety Training courses
- Signage:
    - Safety notice points
    - Emergency first-aid procedure signs
    - Emergency floor plans
    - Assembly point maps
    - Fire actions notices
- Emergency Response posters
- Safety booklets
- Website www.dit.ie/safework
- Posters
- Inductions are prepared and delivered by Occupational Health Officers where requested
- The Head of FOCAS, the FOCAS Administrator, and the Nominated FOCAS Health and Safety Officer has an email listing to communicate matters to staff members

HEALTH AND SAFETY RESOURCES

The FOCAS Research Institute codes budgetary spend on activities/spend pertaining to safety, health and welfare. Considerable resources are expended by the FOCAS Research Institute in securing the health, safety and welfare of employees in terms of personnel, time, materials, equipment and the purchase of goods and services.

Where additional equipment, training etc. is required, whether as a result of ongoing risk assessment or legislative change, resources will be allocated on a prioritised basis to meet the identified requirements.

The health and safety website www.dit.ie/safework hosts a reference library of videos, texts, literature and other publications on health and safety matters.

SAFE SYSTEMS OF WORK

It is the policy of DIT to ensure that employees are not asked to perform tasks outside their competence and capacity. Safe systems of work have been designed with this objective in mind.
As some work activities give rise to risks which can only be controlled by adherence to proper procedures, employees are issued with written safe working procedures which should be adhered to at all times.

Standard Operating Procedures/Safety manuals/Codes of Practice include:

1. **SOP UV/Vis**
2. **SOP Fl**
3. **SOP Spectroplorimeter**
4. **SOP FTIR/ FTIR ATR/ FTIR Microscope/ Spotlight**
5. **SOP XRD**
6. **SOP Raman**
7. **SOP Fumehoods**
8. **SOP Furnace**
9. **SOP Oven/ Vacuum Oven**
10. **SOP Sonic Tip**
11. **SOP Liquid Nitrogen**
12. **SOP Spills**
13. **SOP Waste disposal (Chemical/biological)**
14. **SOP Fire Evacuation**

SOP 1-11 see appendix 2
SOP 12-13 see appendix 5
SOP 14 see appendix 4

The FOCAS Health and Safety Team shall keep a watching brief on safety matters and where necessary adjust or alter systems of work to make them as safe as is reasonably practicable.

PROCUREMENT CONTROL

Equipment:
The purchase of equipment, plant and substances is subject to the provisions of the *Safety, Health and Welfare at Work Act 2005* and associated regulations, and thus all equipment, plant or substances will undergo risk assessment prior to acceptance into the Institute. The FOCAS Research Institute follows all the guidelines as per the Framework Safety Statement and ensures that a risk assessment is carried out before any equipment/machinery or contractor/service provider is engaged by the FOCAS Research Institute. Details of equipment/machinery/tools and associated risk assessment is available in the Physical Hazards section of the risk assessment.
For all new equipment purchased, the purchaser is to ensure that the equipment complies with recognised ergonomic and safety standards. Machinery suppliers shall be requested to supply all relevant information including specifications for machine guarding, maintenance, noise, fumes, dust, special training needs etc. which will assist in the risk assessment process.

Chemicals:
Any employee requiring a new chemical, either for process activity or as a sample, must first obtain an SDS and have available a risk assessment detailing use, storage and operation. The laboratory co-ordinator ordering the chemicals should monitor this process in consultation with the FOCAS H&S Officer.

Before any new chemical classed as a carcinogen, mutagen and reproductive toxin (CMR) which is subject to the restrictions of the Safety, Health & Welfare at Work Carcinogen Regulations 2001 is purchased, it must first receive approval from the Head of the FOCAS Research Institute. Safety Data Sheets (SDS) and a CMR risk assessment for its use must be provided. This information must be attached to the order form. The laboratory co-ordinator ordering the chemical should monitor this process. There is also a responsibility on the individual ordering the chemicals to ensure that no alternative is available. Sign off procedure must be documented and circulated to technical staff and the FOCAS H&S Officer as a code of practice.

Radioactive chemicals and materials:
Personnel are not permitted to bring radioactive materials on site without the prior written authorisation of the Radiation Protection Officer Dr. Jacinta Brown, School of Physics.

INSPECTION PROCEDURES

All locations of work will be periodically inspected by a representative from the Health & Safety Office accompanied by local management and the Safety Representative. The Head of the FOCAS Research Institute will ensure non-conformances identified are rectified and a log maintained.

Where, in the opinion of the Health & Safety Officer or other competent officer, there is a risk of serious injury and immediate risk to individuals, he/she will have the authority to advise that the activity is stopped until adequate steps have been taken to eliminate risk or if possible reduced to an acceptable level. Where the risk cannot be reduced to an acceptable level and finance is not available, it is the responsibility of the Head of the FOCAS Research Institute to ensure the activity is permanently ceased.

In accordance with statutory requirements, certain examinations, testing and inspections are carried out on specific items. A list of those items, the frequency of inspection and the testing body is presented below:

Item	Location	Test Frequency	Test Company Details
Fumehoods	**Basement First Floor Second Floor**	**Annually**	**NSP**
Fire Fighting Equipment	**All levels**	**Annually**	**Total Fire Protection Ltd**
Gas cylinders	**Basement First Floor Second Floor Third Floor**	**Annually**	**BOC**
Gas lines	**Basement Third Floor**	**As required**	**Irish Medical Gases**

TRAINING

Health and Safety training is a legal requirement specified by the Safety, Health and Welfare at Work Act, 2005. It is also FOCAS Research Institute Policy that all personnel attend such health and safety training and assessment. Please see Health and Safety Training Policy for Staff.

Each person will be made aware of emergency action plans and arrangements pertinent to their workplace as per section 11 of the 2005 Act at induction by completing the online Emergency Response Training (ERT) programme.

In addition to our statutory duty to employees, DIT seeks to provide such training as is necessary to enable the students to undertake their studies in a manner which, in so far as it is reasonably practicable, is safe and does not give rise to risks to health or expose the individual student or other persons to unacceptable levels of risk. The provision and extent of any necessary training is dependent upon the nature of the academic discipline being pursued, the experience and disposition of the students involved, their familiarity with any equipment/substances to be utilised, the environment/conditions where the activities may be discharged, and the extent to which supervision is necessary and available. Risk assessments will highlight where additional student training is required.

Training required for the FOCAS Research Institute includes:

Mandatory Training:

- Emergency Response Training (ERT)
- Manual Handling
- Emergency First-aid for all personnel working in laboratories

Specialist Training: (where required)

- Chemical Safety Training
- Health & Safety Responsibilities: Management Responsibilities
- Health & Safety Responsibilities: Management Workshops
- Gas Safety
- Chemical Risk Assessment Training
- Occupational First-aid Training
- Dangerous Goods Safety Advisor (DGSA) Grant Morton, School of Chemical and Pharmaceutical Sciences (TBC)

EMERGENCY PLANNING AND RESPONSE

SERIOUS INCIDENT/EMERGENCY

- Dial 112/999 (You may need to dial "0" for an outside line)
- Contact DIT Health & Safety Officer - 086 3891080, Core staff – 402 ext 7900, 7902, 7905, 7906, 7907

REQUIRES FIRST-AID

- Seek FOCAS Research Institute first-aider – see Contacts page
- Injured unwell staff/students:

  Occupational Health Officers
  Yvonne McArdle 087 9809135

- Injured/Unwell Students:

  Student Health Centres
  Southside 01 402 3051
  Northside 01 402 3614

If serious/after 5pm/in doubt, go directly to local A & E/local GP

REQUIRES FURTHER ATTENTION

- Staff members should attend their local GP
- Students should attend the Student Health Centre
- Structural safety matters - Should be referred to the Head or Administration, FOCAS Research Institute
- Operational safety matters - Should be documented on a Hazard Report Form and sent to the Health & Safety Office (www.dit.ie/safework)

FIRE & EVACUATION: FOCAS RESEARCH INSTITUTE STAFF

1. **On suspecting a fire i.e. smelling or seeing smoke**
   a. Do not investigate alone
   b. Alert FOCAS Head, administration or technical staff, laboratory co-ordinators

INSTRUCTIONS ON DISCOVERING A FIRE (all staff, students, visitors, contractors/service providers etc.)

- Activate the nearest alarm call point or break glass unit (in stair well), after which
- Contact the FOCAS Head, administration or technical staff, laboratory co-ordinators desk or emergency services
- Fight the fire with the appropriate fire extinguisher
- Fight the fire with the appropriate fire extinguisher
- Only attempt to extinguish a fire if it is safe to do so and if:
  i. The fire is small (i.e. not greater than the size of an average waste paper basket)
  ii. There is an exit to your back
  iii. You have the correct extinguisher and know how to use it

- Leave the building using the nearest exit route
- Disperse from the building and move away to place of safety
- Do not use the lift
- Do not re-enter the building until the "all clear" has been given

INSTRUCTIONS ON HEARING THE EVACUATION ALARM OR OTHER WARNING (all staff, students, visitors, contractors/service providers, first-aiders etc.)

Objectives:
To outline actions to be taken by the FOCAS Research Institute personnel in the event of an Alarm Activation

Duties:
On hearing the alarm activate or other warnings:

- Evacuate the building* immediately by the nearest available exit "sweep searching" areas as you go
- Shut down equipment (gas/electricity) if safe to do so and time permits
- Close windows and doors to confine smoke/fire if safe to do so and time permits
- Instruct personnel to leave the FOCAS Research Institute
- All visitors should be escorted to safety by the person they are visiting
- Anyone in common areas or moving between areas, should immediately join the lines of people exiting
- If required, assist any individuals to evacuate the area
- Form a single file on both sides of the corridor or stairway, leaving the centre passageway clear
- Do not delay or stop to collect personal belongings
- Do not use the lift
- If heavy smoke present, try to find another exit or crouch low to the floor
- All doors should be closed (not locked) by the last person in the line
- Report to your Assembly Points: **Camden Row**
- All evacuation marshals/sweepers, building maintenance personnel, FOCAS Research Institute Management, first-aiders should assemble at the assembly points to check in, reporting to the Incident Controller details of any casualties or people needing assistance with evacuation. This information is then given by the Incident Controller to the Emergency Services
- Confirm to the Incident Controller that the area has been cleared and report details of any casualties or people needing assistance with evacuation to the Incident Controller
- Do not return to the building until instructed to do so by the Incident Controller

* Separate personal emergency egress plans (PEEP) will be prepared for people with disabilities
* All visitors should be escorted to safety by the person they are visiting

YOU SHOULD FAMILIARISE YOURSELF WITH THE LOCATIONS OF THE FOLLOWING:

- Escape routes
- Fire alarm call points
- Fire extinguishers and blankets
- Fire assembly points

The Assembly point for the FOCAS Research Institute is:

1. **Camden Row**

Camden Row	

YOU SHOULD NOT PUT YOURSELF IN DANGER AT ANY TIME

Should the evacuation alarm sound for any reason, one individual must assume the role of **Incident Controller (See Appendix for SOP)**. This will normally be a member of FOCAS Staff or FOCAS H&S Committee, but, out of hours, the role must be assumed by one of the occupants**; ideally the first one to respond should take charge.**

Once the alarm sounders have been activated, the building should be evacuated. Once the evacuation starts it should be run to completion even if the source of the alarm is identified and resolved early on.

The Emergency Services (112 or 999) must be contacted straight away, unless it can be immediately confirmed that the activation is a false alarm.

The Incident Controller must put on an **ORANGE** high visibility jacket, available at FOCAS Reception desk.

Throughout the evacuation, the Incident Controller should remain close to, but at a safe distance from the main entrance so that they can liaise with Evacuation Marshals and the Emergency Services.

When the Emergency Services arrive, the Incident Controller must give them the Fire Register, which is located at each reception desk.

The Incident Controller must also pass on any other relevant information to the Emergency Services. This may include information about the incident (if known), information about chemicals, gases or dangerous substances, details of persons still in the building or areas not swept.

The Incident Controller should not allow him/herself to be unnecessarily distracted by staff or students. Anyone speaking to the Incident Controller unnecessarily should be firmly told **"The evacuation alarm is sounding, please leave the building".**

When the Emergency Services arrive on site, the Incident Controller hands full responsibility of the building and the incident to the Emergency Services. From that point on the Incident Controller's duty is complete and they should proceed to the assembly point.

The Buildings Maintenance Manager for the premises, Colm Gillen, 402 4646, 087 2888294 and the Head of the FOCAS Research Institute Hugh Byrne on 402 7900, 087 6305063 must be notified at the earliest opportunity.

The Following Procedures Relate to Spurious Activations Only;

- If it can be confirmed immediately that the alarm activation is a false alarm, the monitoring station **8058399** should be contacted straight away and advised of the situation
- The alarm should not be silenced as this could hide an unresolved problem. Procedure to be confirmed by the Buildings Office
- After the evacuation has concluded and the alarm has been reset, the building should only be re-entered when the "all clear" has been given by the Incident Controller. The Incident Controller should only give the all clear if they are absolutely satisfied that the cause of the spurious activation has been identified and resolved and the alarm has been successfully reset.
- The Incident Controller should then coordinate the resetting of all Fire Doors, Shutters, Automatic Smoke Vents and Lifts. Checklist to be confirmed by the Buildings Office
- Once the incident has been dealt with, the Incident Controller must complete an Incident Report Form located in the foyer of the Focas Research Institute and notify the Buildings Maintenance Manager for the premises Colm Gillen, 402 4646, 087 2888294 and the Head of the FOCAS Research Institute, Hugh Byrne on 087 6305063.

FIRST-AID

- An emergency first-aid kit and automatic external defibrillator (AED) is available in the foyer.
- A list of Institute Staff who have completed training in first-aid/AED is available on the health and safety website

Trained Occupational First-aiders include:

- Anne Shanahan
- Damian Bruce

First-aid kits are located in:

- Sample Preparation Laboratory (basement)
- Steady State 1 Laboratory (basement)
- Steady State 2 Laboratory (basement)
- RESC (1st floor)
- Nanolab (1st floor)
- MSA (2nd Floor)
- Environmental Laboratory (2nd Floor)
- Ground floor kitchen
- Foyer
- 3rd Foor – Kitchenette

Please report any used items to the designated person in charge who is responsible for monitoring the contents and ensuring their replacement.

Further Treatment / Incident Report Forms

- Staff may refer students to the Student Health Centre in DIT, Aungier Street at 01 402 3051 or contact the Emergency Services on 112 / 0999 if an incident is urgent
- Incident Report forms are available from the Foyer. When completed and signed the top white copy should be sent the DIT Health & Safety Officer
- An Occupational Health Officer (Yvonne McArdle) is available at 087 9809135 weekdays 9:00am – 5:00 pm to deal with the occupational health, safety and welfare needs of all staff and students and to provide a backup first-aid service

INCIDENT REPORTING AND INVESTIGATION

The Institute has a statutory duty to record all incidents and report certain types of incidents and dangerous occurrences to the Health and Safety Authority (HSA). Therefore, all incidents resulting in personal injury, damage to property, dangerous occurrences or near miss e.g. must be reported immediately to your Manager/Supervisor.

The incident report form must be forwarded to the Health & Safety Officer within 24 hours of the incident occurring or as soon as possible. Incident report forms are available at the front desk/reception area.

HAZARD REPORTING

DIT recognises the part that its staff/students/visitors and contractors/service providers have to play in the reporting of hazards in the workplace. There is a report form to formally identify and report hazards. If the hazard is a structural issue, it should be reported immediately to the Head or Administrator of the FOCAS Research Institute and if it is an operational safety issue, it should be reported to local management using the Institute's Hazard Report Form available on the health and safety website.

MANAGEMENT OF CONTRACTORS/SERVICE PROVIDERS

All work undertaken by outside contractors/service providers on behalf of the FOCAS Research Institute must be carried out under a Buildings Office 'Permit to Work'.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

It is the policy of DIT to eliminate all hazards where reasonably practicable. DIT will assess what PPE appropriate to the task/work environment is required only as a last resort when further risk reduction is not feasible.

All PPE and safety equipment purchased by the FOCAS Research Institute must be of approved standards and comply with relevant EC Directives regarding design and manufacture. Defects shall be reported to Laboratory Co-ordinators or Supervisors in Group Laboratories or FOCAS Technical personnel in FOCAS Core laboratories.

The various areas where PPE must be worn are outlined in the risk assessments. This is further complemented by signage. PPE shall be provided and must be worn in designated areas and whilst carrying out specific tasks, based on the risk assessments.

All PPE must be appropriate for the risks involved without it leading to increased risk. It should be chosen based on assessment and in consultation with staff members. The PPE should be used only for the purpose specified and where it is necessary to wear simultaneously more than one item of PPE, they must be compatible with each other and continue to be effective against the risks involved. Personnel should report to the Laboratory Co-ordinators or Supervisors in Group Laboratories or FOCAS Technical personnel in FOCAS Core laboratories immediately when the PPE is faulty or defective or if they have any medical condition that may affect the correct use of the PPE.

PPE should be of a type suitable for the conditions in the workplace and take account of the user's state of health. It is in principle intended for one's personal use only, however if it is necessary for an item of PPE to be worn or used by more than one person, measures should be taken to ensure that it does not create any health or hygiene problems for the users. The supply, issue and record of all PPE is the responsibility of Laboratory Co-ordinators or Supervisors in Group Laboratories or FOCAS Technical personnel in FOCAS Core laboratories. Employees and students must be informed of all risks they are being protected from, instructed on the use of the PPE and given adequate information, training and demonstration in the wearing of such equipment and the level of protection afforded by its use. Every person provided with PPE must take reasonable care of such equipment and must make proper use of it where there is a foreseeable risk of injury and where they have been instructed to do so. They must also ensure that it is returned to storage subsequent to use. Supervision and monitoring are required to ensure PPE is used/worn by the Laboratory Co-

ordinators or Supervisors in Group Laboratories or FOCAS Technical personnel in FOCAS Core laboratories.

Personnel shall inform any person in the area including contractors/service providers, students and visitors of the statutory and local policies in place with regard to PPE.

It is the responsibility of Laboratory Co-ordinators or Supervisors in Group Laboratories or FOCAS Technical personnel in FOCAS Core laboratories to select appropriate PPE and supervise students to ensure they wear it. Contaminated PPE should remain in the work area and not be worn into any "clean" areas such as offices or canteen. PPE that is contaminated must be discarded as chemical waste or decontaminated prior to routine laundering.

PPE should be specified within the risk assessments where required.

Gloves
The hazards of the materials that will be used are evaluated prior to selecting gloves. Nitrile examination gloves are appropriate for most routine work. These gloves are single-use only; they cannot be washed and reused. Gloves must be checked for holes or tears. Gloves must be selected with the agreement of the laboratory co-ordinator.

Respiratory Protection
Respiratory protection may be necessary if aerosol generation cannot be prevented or contained by other means.

Eye and Face Protection
Safety glasses must have side shields. Chemical splash goggles may be necessary if the work involves chemicals. A face shield may be necessary in addition to the safety glasses or goggles if the potential for splashing, spraying, or aerosol generation exists.

Laboratory Clothing
Shorts, sandals, and open-toed shoes should not be worn in the laboratory. Howie-style laboratory coats must be worn and buttoned, to protect clothing from potential contamination. Lab coat sleeves should be long enough to enable the wearer to overlap the glove cuffs with the sleeves. The laundry of lab coats is the responsibility of each individual. Once a lab coat is contaminated it should immediately be changed for a clean coat. Where head scarves are worn, they must be tight-fitting to the head.

ERGONOMICS

All new equipment and machines, tools, work methods, work procedures and workstations should be assessed for ergonomic hazards prior to being brought into use. The Health & Safety Officer should be informed of the risk assessment process and will advise of competent people to assist with the risk assessment.

It is the responsibility of the Head of the FOCAS Research Institute to ensure that all information on ergonomic controls is communicated to employees and students via circulars, team briefings or other means. He should also ensure that all problems identified are addressed and brought to the attention of the Health & Safety Officer.

WELFARE PROVISIONS

In accordance with legislation, Dublin Institute of Technology is committed to providing welfare facilities which are available to all staff which include the following:

- ✓ Adequate and suitable sanitary and washing and drying facilities with hot and cold running water maintained in a clean and hygienic condition
- ✓ Adequate number of lavatories and washbasins with hot and cold running water
- ✓ An adequate supply of potable drinking water at suitable points conveniently accessible to all employees, tested by the Buildings Office
- ✓ Suitable facilities for sitting/other ergonomic support, in the case where work can be done in a seated position
- ✓ Easily accessible rest rooms/areas with seats with backs
- ✓ Adequate ventilation, temperature and lighting
- ✓ Fire detection and fire fighting equipment
- ✓ Emergency routes and exits
- ✓ Clean and well maintained interior walls, floors and traffic routes
- ✓ Rest facilities for pregnant ladies or breastfeeding mothers are available in Room 225, Kevin Street

- Everyone is obliged to care for these facilities and must not misuse them. All welfare provisions should be maintained in a clean safe condition
- Arrangements for regular cleaning of premises and removal of waste should be made by the local Building Maintenance Manager. Cleaning and waste disposal are managed by Noonan Cleaners. Arrangements for cleaning and waste disposal is outlined in the risk assessments below
- Drinking water is available to all personnel on all floors of the building in the form of water fountains and kitchen

SENSITIVE WORK GROUPS

Protection of Children and Young Persons
In cases where children must be present on Institute premises and therefore affected by our acts/omissions, sufficient notification must be given to the Health & Safety Office by the DIT host representative, of the situation, so that an appropriate risk assessment may be carried out. When on DIT property, the parents/guardians/host representative charged with responsibility for bringing the child onsite, must be responsible for that child and ensure that at all times they are supervised and protected from activities, processes, equipment, machinery, agents etc.

All staff must familiarise themselves with the **DIT Child Protection Policy**. (DIT HR website)

Pregnant Post-Natal and Breastfeeding Employees/Students
The *Safety, Health and Welfare at Work (General Application) Regulations 2007*, places a duty on employers to assess the risks to determine any possible effects on new/expectant mothers resulting from any activity at the place of work.

- Each risk assessment will identify hazards in the workplace that could pose a health and safety risk to new and expectant mothers
- Where the assessment reveals a risk, then appropriate preventive or protective measures will be taken.

- Pregnant employees/students should advise their Line Manager and the DIT Health & Safety Office of their condition as soon as they are aware they are pregnant so that a confidential pregnancy risk assessment may be carried out
- Risk assessments are carried out by the Occupational Health Officer and the Line Manager/Supervisor or a representative from the area (where applicable)
- On returning to work/college any new mothers who are breastfeeding and require facilities should contact the Health & Safety Office

LONE AND OUT OF HOURS ACCESS

This refers to working in DIT buildings (VPN access is authorised through Line Management).

Lone working/out of hours access takes place in the FOCAS Research Institute as per the policies and procedures of the FOCAS Research Institute. See out of hour access and policies in appendix 3.

TRIPS/TRAVEL

Field trip risk assessment (see appendix 6)

Trips that take place to Schools. Staff must complete a risk assessment prior to trips. All trips and travel proposals must have a risk assessment completed prior to the event.

STAFF/STUDENTS WITH DISABILITIES

When a disability is notified to the Disaibility Service, Health & Safety Office or the FOCAS Research Institute, specific risk assessments will be completed to ensure that the health and safety needs of staff and students with permanent/temporary disabilities are taken into account. Preventative and proactive measures will be put in place following the risk assessment if specific hazards are identified. Personal emergency egress plans (PEEPs) will also be prepared if required. The Disability Liaison Officer will provide specialist and competent advice and liaise with the Health & Safety Officer, Occupational Health Officers, Head, FOCAS Research Institute and Building Maintenance Manager. The onus is on visitors with a disability to notify the FOCAS personnel they are visiting of any disability, such that they may be able to assist in evacuation if required.

Please ensure all personnel are familiar with the procedure and are referred to relevant services where necessary.

HEALTH SURVEILLANCE

Risk assessments will determine if health surveillance is required. Health Surveillance is made available to all personnel appropriate to the health and safety risks present and facilitated by the Health & Safety Office. In certain circumstances, personnel may be referred to our external Occupational Health Physician for a health assessment in relation to their work/studies to ensure that we can put in place any additional corrective action if required.

Eye tests are available for regular visual display unit users at the National Optometry Centre (NOC). Please familiarise yourself with the eye test policy which is available on the health and safety website. Persons who require glasses are required to have prescription safety glasses which are provided through the NOC.

WORKPLACE DRUGS, INTOXICANTS AND ALCOHOL

An employee/student must ensure that he or she is not under the influence of an intoxicant to the extent that he or she is in such a state as to endanger his or her own safety, health or welfare or that of any other person. Contraventions will be dealt with as per DIT disciplinary procedures.

DIGNITY AT WORK ANTI BULLYING & HARASSMENT POLICY AND PROCEDURES

The Institute's Dignity at Work Anti Bullying & Harassment Policy and Procedures deals with complaints against members of staff in the workplace which also includes work associated events such as meetings, conferences and work related social events, whether on the premises or off site. Bullying or harassment of staff/students will not be tolerated. Please ensure that all staff are familiar with the relevant policy/procedure.

STRESS

The risk assessment will identify any areas where work-related stress is a hazard and controls will be implemented to eliminate this hazard. The Human Resources department should be consulted immediately by the Head of the FOCAS Research Institute if an issue regarding stress is highlighted by any personnel or a medical certificate. An Employee Assistance Programme (EAP) is available to all staff. Students should liaise with their supervisors in relation to issues regarding stress. Students may also seek assistance from the Student Health Centre and Student Counselling Service.

AUDIT, REVIEW AND COMMUNICATION

The FOCAS Research Institute ensures that periodic health and safety audits are completed and a review of all Safety Statements and documentation takes place. This will be approved by DIT SLT Health and Safety Sub-Committee. All changes will be communicated to all staff, students, visitors and contractors/service providers. The most recent revision of all Safety Statements will be available on the DIT safety website and from the FOCAS Research Institute Administrator.

DOCUMENT CONTROL

This document is a controlled document and as such any updates, review and distribution will be in accordance with DIT's standards for such documents. Only controlled copies will be updated when required.
The Head of the FOCAS Research Institute will issue new documents after appropriate consultation and agreement with relevant parties.

HAZARD IDENTIFICATION, RISK ASSESSMENT AND CONTROL MEASURES

It is the policy of the Institute to identify hazards in the workplace, assess the risk to safety and health and control these risks as far as is reasonably practicable.

The Framework Safety Statement outlines the generic hazards which have been identified and the control measures that are in place.

It is incumbent on those responsible for managing their areas of work, at all levels, not merely to observe the arrangements described in the Framework Safety Statement, but to assess their applicability within their area of authority and where necessary to refine and extend them to deal with particular local situations. The management of the Dublin Institute of Technology is committed to ongoing identification of hazards, assessment of the appropriate risks and the introduction of controls to deal with them. Management at all levels have a responsibility to apply this principle within their area of authority.

Personnel are encouraged to become involved and participate in safety, health & welfare issues. In particular, they are encouraged to identify any potential hazards which may exist, and to ensure that a risk assessment is carried out.
Hazard inspections will be carried out periodically to ensure that the information is updated, controls are adequate and where necessary the risks are reassessed.

A **"hazard"** is taken to mean "any substance, article, material or practice which has the potential to cause harm to the safety, health or welfare of staff, students, visitors, contractors/service providers in DIT". Hazards may be classified as:

- Physical
- Chemical
- Biological
- Operational
- Human Factors

"Risk" is a measure of the probability of the event occurring and the severity and extent of the injury, ill health or damage it may cause if it did occur.

Risks may be classified as:

- High
- Medium
- Low

High	Occurrence is probable, and could cause a fatality, serious injury or serious ill health to an individual or group of people.
Medium	Occurrence is possible and could cause injury or ill health to an individual or a small group of people.
Low	Occurrence is possible but unlikely, only minor injury would be caused and would probably be limited to a single individual.

The classification of hazards should be used to develop the priority of control measures, remedial actions, and the allocation of resources. As a general rule, the control measures will seek to eliminate any risk classified as high and reduce the potential of risks classified as medium or low.

Risk control measures are a combination of:

Elimination	Where the hazard is removed
Substitution	Where the hazard is exchanged for one of lesser classification
Isolation	Where the hazard is contained (e.g. Enclosures, guards etc.)
Engineering	Where common systems are used to protect all exposed to risk (e.g. Fire alarms, ventilation systems etc.)
Procedure	Where procedural controls are used. This will include procedures such as Standard Operating Procedures and training and the provision of information may apply to any and all of the above control measures
Personal Protection	Whereby the above means, the risk cannot be reasonably be reduced further, but an unacceptable level of risk remains, the team members are individually protected from the risk

Risk Assessments for FOCAS Research Institute

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	FIRE Emergency Response & Evacuation **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **People with disabilities**	• Staff unfamiliar with evacuation procedure • Lack of evacuation drills • Use of naked flames • Improper storage of flammable or combustible materials • Smoking • Faulty electrics • Inadequate emergency equipment • Misuse of equipment • Gas leak	• Staff trained in ERT • Sufficient firefighting equipment available (break glass units, extinguishers, fire blanket) • Firefighting equipment and detection systems maintained and tested • Evacuation signage in place • Emergency and first-aid procedures posted • Good housekeeping standards maintained • Several means of escape present and known to occupants • Evacuation procedure practiced each semester • Assembly point known to occupants • Occupants escort visitors out	• Maintain current controls • Reduce fire load, especially of paper, in offices	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

			• All exits are clear and free from obstructions • All personnel act as evacuation marshals • No smoking policy in place • Scheduled maintenance of buildings services (heating, electricity, ventilation etc.) takes place • Hot work permit system in place where needed • Compliance with building regulations • Site-specific Emergency Manuals available • Fire blankets available in each lab • Appropriate protocols for chemical storage				

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Manual Handling **Examples: Moving hazardous materials, substances, apparatus, furniture, audio visual e.g. lab books, manuals and gas cylinders etc.** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **People with disabilities**	• Manual Handling-related injuries, e.g. back injury • Slips, trips, falls • Contact with hazardous materials, substances etc.	• All personnel compliant with and adhere to mandatory manual handling training • Trolleys, stools available for staff • Manual handling risk assessments available to all staff, contact local Occupational Health Officer • PPE used/worn where necessary • Good housekeeping • Suitable environment • Implement team lifting were required • Adequate lighting maintained • Report issues to Line manager • Items not stored above shoulder height • Lift used instead of stairs	• Refresher training to be carried out where necessary • Implement manual handling training	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Work Equipment, Machinery & Tools **See Specific Hazards Risk Assessments**	• See SPECIFIC EQUIPMENT RISK ASSESSMENTS • Noise • Vibration • Entanglement/ crushing • Electrics • Fumes/ dust • Contact with moving parts	• Guards in place • SOP in use and maintenance • Training given and records kept • Service and maintenance • Signage in place • Supervision of students • Visual check before use • Report defects to FOCAS technical staff/Laboratory Co-ordinator/Supervisor • Emergency stop • PPE worn/used • Follow manufacturer's instructions • Shut down after use and end of day • CE mark or equivalent mark as minimum • Damaged equipment marked and taken out of service	• Maintain current controls	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Portable Appliances & Handheld Equipment **e.g. Laptops**	• Entanglement/ crushing • Electrics • Fumes/dust • Slips, trips and falls from cables • See also Ergonomics	• Service and maintenance (PAT) where required • Visual check before use • Report defects to FOCAS technical staff/Laboratory Co-ordinator/Supervisor • CE mark • Shut down after use and end of day • Follow manufacturer's instructions	• Maintain current controls	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Noise **Examples:** • **Fumehood fan** • **Q Sun** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Hearing loss / damage • Disruption/ distraction • Interference with communications and warning signals • Fatigue • Tinnitus	• Exposure times very short • Noise <80dB • Monitoring can be carried out by the DIT Health & Safety Office where need arises • Engineering controls • Information and training provided to staff and students • Follow manufacturer's instructions	• Contact DIT Health & Safety Office where circumstances change / monitoring is required	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Structural: **Floors** **Walls** **Ceilings** **Doors** **Fixed Shelving** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Personal Injury • Slips, Trips and Falls • Collapse • Trapping	• Building appears to be structurally sound • Defects and hazards are reported to the Buildings Office through online hazard reporting • Doors open and close safely	• Remove any material that blocks vision panels on doors • Replace ceiling tiles that are missing • Repair loose/missing door handles • Repair door locks • Contact Buildings Office if problems arise	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Slips, Trips & Falls **Most flooring in FOCAS Research Institute is carpet e.g. offices; or Linoleum e.g. present in labs** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Slips, trips and falls • Uneven surfaces • Wet floor conditions • Raised obstacles	• All routes kept clear and unobstructed • SOP for cleaning – floors generally cleaned early morning See Noonan risk assessment • Use of warning signage where appropriate • Hazards are reported • Changes in floor levels identified and marked • Door mats provided at entrance (main entrance) • SOP for spillages • Handrail on steps/stairs • Stair nosing fitted with anti slip finish • Adequate lighting • Good housekeeping • Retort stands stored above waist height	• Cables to be positioned/fixed so as to avoid slips, trips or falls • Fire load to be reduced (especially of paper) in offices • Housekeeping to be improved • Maintain current controls • Buildings Office to ensure upkeep and maintenance of internal and external access and egress routes e.g. walkways, paths, driveways, floors, corridors, steps and stairs	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Access and Egress **Opening Times: 24hr Access** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Security threats • Threats from public • Violence / Assault • Unwanted visitors • Unauthorised access	• CCTV in place • Suspicious activity reported to Head of the FOCAS Research Institute and/or Administration • ERT covers procedure for suspicious activity • Good housekeeping **Laboratories** • Undergraduate students are not permitted to enter labs without a staff member/Supervisor • Appropriate signage on lab doors where hazardous substances are in use/stored	• Report suspicious activity to FOCAS Head, or Administration or Gardaí immediately • All substances should be put away as soon as possible where practicable and necessary	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Photocopiers & Printers **Shared staff printers and photocopiers available in various offices** **Who is harmed:** • **Staff members** • **Visitors** • **Contractors** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Changing toner etc.: chemical contact • Clearing jams: burns • Not wearing gloves • Not turning off electrical supply • Incorrect disposal • Personal injury • Lack of information / training	• Toner / print cartridges changed by staff members who wash hands after use • Follow instructions on printer when clearing jams • Disposal as per manufacturer's directions • Maintenance by DIT IS where required • Correct disposal of waste cartridges • Follow manufacturer's instructions	• Maintain standards • Gloves to be supplied and worn while changing toner • Power must be turned	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT IS**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Ergonomics: Office / Workstation **Who is harmed:** • **Staff members** • **Visitors** • **Contractors** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• MSD's • Upper limb disorders • Poor posture • Back problems • Fatigue • Slips, trips and falls	• Online eLearning programme available • Workstation risk assessments and information and training available from the Health & Safety Office on request • Contact OHO if risk assessments are required • Eye tests available to staff from NOC • Adequate services (heating, lighting ventilation) in place • Follow manufacturer's instructions when using equipment	• Maintain standards • Housekeeping to be improved • Good cable management required	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Health & Safety Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Hot Surfaces / Liquids / Solids **E.g. Hot plates; Cups of hot beverages** **Please see Specific Hazards Risk Assessment** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Contact burns • Scalds • Spillage • Exposure to hazardous chemicals and substances	• Notify cleaners of spillages • Spillages cleaned up immediately • SOP in place for spillages: Noonan • Wet floor signage available for spillages • SOP available for Spillages	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Noonan Cleaners**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Pressure Systems **Examples** • **Gas cylinders** **Please see Gas and Specific Hazards Risk Assessment** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Contact burn • Personal injury • Explosion • Spillage • Release of steam/ fluid / air	• SOP in place • Service and maintenance • Training provided to staff • Defects are reported • PPE worn/used • First-aid kit available • Signage in place where required • Follow manufacturer's instructions • Certificate of test examination	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Services: Heating **Gas fired central heating in place throughout the FOCAS Research Institute** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Environment too hot or cold • Electrical hazards • Misuse of portable heaters • Leaks • Fire • Burns • Carbon monoxide poisoning	• Electrics appear to be up to standard • Cables neatly positioned • Contact Head and/or Administration, FOCAS Research Institute if problems or defects arise • Service and maintenance carried out by competent person • Combustible materials kept away from heat source • Heat source kept clear and free from obstruction • Environmental monitoring from the Health & Safety Office on request • Adequate ventilation by openable windows and AC system	• Maintain standards • Reduce fire load, especially paper, in offices	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Lighting **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Inadequate lighting • Glare • Slips, trips, falls	• Light switches easily accessible (height) • Adequate lighting in place • Defects are reported to Head and/or Administration, FOCAS Research Institute • Protective coverings in place where required • Environmental monitoring available from the Health & Safety Office on request • Service and maintenance carried out by competent person	• Maintain standards • Replace missing bulbs and flickering lights	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Ventilation and temperature **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Environment too hot or cold • Inadequate ventilation • Falls from heights from windows	• All windows openable • Safety catches in place where required • Blinds in place and in working order where required • Suitable equipment available for the opening and closing of windows • Defects are reported to Head and/or Administration, FOCAS Research Institute • Service and maintenance of ventilation system carried out by competent person • Office temperature of at least 17.5^{o}C (after one hour of work) • Environmental monitoring from the Health & Safety Office on request	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Electricity **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Electric shock • Electrocution • Ignition source • Fire • Explosion • Death • Electrical arcing • Damaged electrical equipment • Use of faulty equipment • Contact with live parts • Unmarked distribution boards • Inadequate electrical installations	• Sufficient numbers of electrical sockets • Electric leads not trailing and good cable management • Sockets are not overloaded • Competent person to carry out repairs / works • All works servicing and testing is carried out as per regulations • Shut down when not in use and end of day • Contact Head and/or Administration, FOCAS Research Institute if problems arise • Adequate protection for circuit boards, distribution boards etc. • Report defects, take equipment out of use • Good housekeeping	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Class 3B Lasers **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Skin injury • Eye injury • Unauthorised access	• SOP in place for use • Beams are horizontal • Information and training • Signage on door where required • No personal jewellery permitted • Safety goggles provided		**With current controls: M** **With Actions applied: M**	**FOCAS Research Institute Personnel** **Manager, IEO**	**Ongoing**

PHYSICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Construction / Maintenance Work **Examples:** • Noonan Cleaners • Building contractors **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Unfamiliar with DIT buildings and safety procedures • Injury to contractors, staff, students, members of the public	• Buildings Office control all contractors and send communication to staff regarding works • Sign in required • Compliance with DIT code of practice for contractors • Signage in place • eLearning completed before contractors arrive on DIT premises including the need for PPE in laboratories • DIT Contractor safety badge issued and worn • Risk assessment and method statements completed and submitted to the Buildings Office • Good housekeeping standards maintained • Areas of works cordoned off •	• Maintain standards	**With current controls: L** **With Actions applied: L**	**DIT Buildings Office**	**Ongoing**

OPERATIONAL							
Ref	Hazard	Hazard Potential & Consequences	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Work Activities / Processes **Please see Specific Hazards Risk Assessments**						

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Housekeeping **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Slips, trips and falls • Increased fire load • Falling objects • Collisions • Spillages	• Equipment stored on suitable shelving/in suitable cabinets / containers etc. • Fire load kept to a minimum • All routes kept clear and unobstructed • Wet floor signs in place when required • Spillages cleaned up immediately with spill kit • Adequate lighting in place • Adequate waste disposal • Designated chemical stores and equipment stores in place • See controls for slips, trips & falls also • Spillages SOP in place **Appendix 5** • See Spillages also	• Maintain standards • Reduce fire load, especially of paper, in offices	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Cleaning **Cleaning is undertaken by Noonan Cleaners** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Lack of cleanliness or hygiene • Manual handling injury • Exposure to hazardous substances • Spillages: slips, trips and falls • Lack of/inappropriate PPE	• Noonan's clean floors of laboratories; mostly when building is unoccupied • PPE used/worn where required • Materials and containers adequately labeled • Training and information (chemicals) • Wet floor signage in place when required • Adequate and designated storage area for cleaning materials and equipment • Use of appropriate cleaning equipment • Report defects and hazards • Manual handling training completed and implemented	• Maintain standards	**With current controls: L** **With Actions applied: L**	**Noonan Cleaners**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Waste Disposal & Removal: General **Removal of waste by Noonan Cleaners usually during cleaning** **Please see also Chemical & Clinical Waste** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Waste accumulation • Fire • Sharps injuries • Exposure to bodily fluids • Manual handling injury • Exposure to hazardous substances • Spillages: slips, trips and falls • Lack of/inappropriate PPE	• Recycling bins available: paper, shredding etc. • See Noonan SOP & risk assessment • General waste segregated by Thorntons • Waste removed on a regular basis • PPE worn/used by Noonan Cleaners • Instruction and training given to operators • Labeling of waste where necessary • Designate waste storage area present • Manual handling training completed/implemented • Equipment for transport of waste e.g. trolleys • See Chemical & Clinical Waste • DIT policy in place: Safe Handling of Sharps & Needle Sticks Policy	• Maintain standards	**With current controls: L** **With Actions applied: L**	**Noonan Cleaners**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Signage and Documentation **Please see Specific Hazards Risk Assessments** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Lack of knowledge regarding safety procedures	***Signage in place includes***: • Signage on lab doors as per hazards: chemical, gas, laser, radiation etc. • 'No entry' signage where required • PPE signage where required • Emergency Exit • Emergency First-aid • Evacuation plan • Safety Notice points • Fire Action Notice Points • No Smoking ***Other***: • Emergency contact numbers in each laboratory • Safety booklets/safety wallet cards available • Defects reported to FOCAS Management/Administration	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Incidents **Hazard Reporting** **First-aid** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Lack of first-aid supplies • Lack of trained first-aiders • Lack of knowledge of procedure in the event of an incident • No reporting of incident(s) • No reporting of hazards	**Each lab has:** • First-aid kit • Staff trained in first-aid • Emergency contact numbers • Emergency first-aid procedure posted **Front desk/Reception**: • Incident report book • AED & first-aid kit • Emergency contact numbers **General**: • All incidents are reported immediately and an incident report form completed • First-aid supplies available from OHO on request • List of trained first-aiders & AED users available on the DIT website http://www.dit.ie/safework	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Use of Ladders / Working at Height **FOCAS Personnel are not normally required to use ladders/work at height**	• N/A	• N/A	• N/A	• N/A	• N/A	• N/A

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Lone Working/ Out of Hours Access	• Violence • Inability to make contact in the event of an emergency etc. • Unauthorised access	• Swipe card system in place • All personnel with access to the FOCAS Research Institute are required to have first aid, manual handling and emergency response training • DIT Policy in place • Risk assessment carried out and control measures implemented • Buddy system in place • Structural and security controls for safe access and egress • Mandatory training completed	• Periodic Review of FOCAS Access policy and procedures (Appendix 3)	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Excursions **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Injuries • Medical emergencies • Accidents and incidents • Missing persons • Substance abuse • Road Traffic Accidents • Inclement weather • Chemical hazards • Biological hazards • Human Factors	• DIT excursion risk assessment in place • DIT excursion guidelines in place • Separate excursion risk assessment template completed for each trip and control measures implemented • Information provided to trip participants • Elearning programme available to participants on request: Contact OHO	• Maintain standards • Ensure risk assessments are carried out for each trip	**With current controls: L** **With Actions applied: L** **Risk Assessment form available in Appendix 6**	**FOCAS Research Institute Personnel** **DIT Health & Safety Office**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Work Placement **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Injuries • Accidents and incidents • Lack of familiarity with work environment and work practices	• Risk assessment carried out and control measures implemented • Work placement factsheets provided to participants: contact the Health & Safety Office • Pre-placement induction safety talks: contact the Health & Safety Office • Guidance notes available to students • All incidents are reported to DIT • Insurance cover provided • Training and supervision given to students where required	• Maintain standards • Ensure risk assessments are carried out for work placement	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Health & Safety Office**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Events Hosting **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Injuries • Accidents and incidents • Unfamiliar with DIT premises and emergency plans	• Risk assessment carried out and control measures implemented • Emergency plans in place as per risk assessment • Report all incidents and accidents to DIT	• Maintain standards • Ensure risk assessments are carried out for all work placements	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Conferences / Seminars **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Travel to and from • Road traffic accidents • Unfamiliar with venue • Medical emergency • Missing persons	• Taxi vouchers available to staff • Staff obey rules of the road if driving or cycling • Adequate insurance, tax and NCT on vehicles used for transport • Familiarise yourself with local emergency procedures and first-aid arrangements • Report defects and incidents to venue management or Gardaí where necessary • Approval sought from Line Manager as per DIT procedures	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

OPERATIONAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Storage: General **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Explosion, fire, various reactions as a result of improper/incorrect storage of chemicals • Inadequate storage • Improper storage • Inadequate space for safe manual handling • Poor housekeeping • Slips, trips and falls • Unsafe access and egress • Inadequate lighting and/or ventilation	• Only competent personnel enter storage areas • Safe access and egress • Storage avoided above shoulder height where possible • Items stored appropriately and segregated where required • Storage cabinets/units secure and fit for purpose • Locking system in place for storage cabinets/units • Step ladder available for accessing higher shelving units • Staff trained in manual handling and apply training: see 'Manual Handling' also • Appropriate signage in place • Items not stored in walkways • Defects reported immediately • Adequate lighting and ventilation in place	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Sensitive Work Groups: **Pregnant Employees /Students & Nursing Mothers**	• Harm to Mother, unborn child or breastfeeding baby • Physical risks • Chemical risks	• Risk assessment carried out for pregnant employees/students and control measures implemented as identified and necessary by Health & Safety Office • Risk assessment will be completed in conjunction with the Line Manager/Supervisor from the relevant area necessary • Room available (Room 225, DIT, Kevin Street) available for resting, breastfeeding and expressing milk • Follow medical advice	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Health & Safety Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Sensitive Work Groups: **Young Persons (on premises)** **Circumstances include:** • **Transition Year Students** • **Event attendees**	• Injuries • Accidents and incidents • Lack of training and experience • Lack of familiarity with DIT work environment, work practices and emergency plans • Physical risks • Chemical risks • Biological risks • Hours of work	• General induction process given by Function • Induction available from the Health & Safety Office on request • Elearning available from Health & Safety Office • Training and supervision given • DIT Child Protection Policy in place • DIT emergency plans in place • All incidents are reported to DIT • Student support services available • Garda vetting in place	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Event Organisers** **Academic Supervisors** **DIT Health & Safety Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Sensitive Work Groups: **People with Disabilities**	• Lack of access/egress • Difficulty with evacuation • No risk assessment (RA) completed	• DIT Disability Office send information to DIT Health & Safety Office • Risk Assessment carried out by the Health & Safety Office • Personal Emergency Egress Plan (PEEP) completed where necessary • Reasonable accommodation identified in risk assessment • Lift present and in working order • Disability Support Service available • Disabled toilet: ground floor • Induction/E learning available from Health & Safety Office on request	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office** **DIT Health & Safety Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Sensitive Work Groups: **New Recruits: Full-time and part-time staff members**	• Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of training and experience • Lack of familiarity with DIT work environment, work practices and emergency plans	• Induction available (in person or online) from Staff Training & Development, including a Health & Safety section • Health & Safety E learning available: contact the DIT Health & Safety Office • Supervisor/Line Manager gives induction for FOCAS Research Institute	• Maintain standards • FOCAS Research Institute SOPs to be communicated to new recruits • Line Manager/Supervisor to give induction for Function • Mandatory training to be completed as soon as possible after recruitment	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Academic Supervisors** **Research Supervisors**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Sensitive Work Groups: **Undergraduates**	• Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of familiarity with DIT work environment, work practices and emergency plans	• Induction available from the DIT Health & Safety Office on request • E learning available from DIT Health & Safety Office on request • Emergency procedures in place for FOCAS Research Institute • First-aid facilities available • Safety induction given by Supervisors where required • Task-specific instructions/ demonstrations provided by Supervisors where required • Supervision of students by Academic staff members • Student support services available	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Academic Supervisors**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Sensitive Work Groups: **Postgraduates**	• Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of familiarity with DIT work environment, work practices and emergency plans • Remote working	• Induction available (in person or online) from Staff Training & Development, including a Health & Safety section • Health & Safety Elearning available: contact the DIT Health & Safety Office • FOCAS Research Institute SOPs in place • Training and supervision in place by Academic Supervisor	• Maintain standards • Academic Supervisor to give induction for FOCAS Research Institute • Mandatory training to be completed as soon as possible after recruitment • FOCAS Research Institute SOPs to be communicated to new recruits • Supervision of postgraduates to be ensured • Ensure plans in place with FOCAS Research Institute where remote working takes place • Role of postgraduate supervisor to be outlined clearly and communicated	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Academic Supervisor** **DIT Staff Training & Development** **DIT Health & Safety Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Occupational Stress **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Physical health effects • Mental health effects • Behavioral effects • Cognitive effects • Workload	• Communication between staff and management • Employee Assistance Programme (EAP) in place provided by VHI to all employees • Occupational Stress Management Policy & Procedures in place • Risk Assessment carried out by supervisors • Training courses available on Stress Management, personal skills etc. to staff • Student services and Student Counselling available • Occupational Health Physician available: Medmark	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Academic Supervisors** **DIT Staff Training & Development**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Violence /Theft **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Theft of money, chemicals etc. • Attacks/assault: verbal, physical etc. between parties i.e. staff, students etc.	• Emergency Response Training (ERT) mandatory for staff • CCTV in place • FOCAS Research Institute Personnel report suspect individuals to DIT Buildings Office • Adequate lighting in place • See Storage of Chemicals • Controlled access to building	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Bullying & Harassment **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Effects on physical and mental well-being	• DIT Dignity at Work: Anti Bullying & Harassment Policy in place • Dignity at Work contact persons available • Employee Assistance Programme (EAP) in place provided by VHI available to all DIT employees • DIT Procedure for complaints and investigations • Student support services available	• Maintain standards	**With current controls: L** **With Actions applied: L**	**DIT Human Resources**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Welfare Facilities: Sanitary Facilities; Staffroom / Canteen **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Inadequate facilities • No potable water • No means for boiling water/heating food • No seating/resting area • No hand-washing facilities	• Hot/cold water available in sanitary facilities • Disabled toilet available on ground floor • Adequate sanitary and hand-washing facilities available • Defects reported to the Buildings Office ***Facilities for seating and taking meals available at:*** • Ground floor kitchen and foyer ***Drinking water available:*** • Water fountains available in the corridors • and kitchenette on ground floor and 3rd floor	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Visitors **Types of visitors:** Event Participants; Erasmus Students **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of familiarity with DIT work environment, work practices and emergency plans	• All visitors to be met by their FOCAS Research Institute contact. • Safety booklets and safety wallet cards available • Emergency and informational signage in place • Risk assessments completed for specific events where groups of visitors are expected • CCTV in place • Deliveries handled by Goods Inwards • Visitors briefed on emergency procedures by the DIT contact they are they are visiting	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Contractors / Service Providers **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Unfamiliar with DIT buildings and safety procedures • Injury to contractors, staff, students, members of the public	• Head of FOCAS to notify Buildings Office where contractors are coming onsite under their remit • Buildings Office control all contractors who also send communication sent to staff regarding works • Compliance with DIT code of practice for contractors • Signage in place • eLearning completed before contractors arrive on DIT premises • DIT Contractor safety badge issued and worn • Risk assessment and method statements completed and submitted to the Buildings Office • Good housekeeping standards maintained • Areas of works cordoned off	• Maintain standards • Contractors/service providers must wear safety glasses in designated areas • Liaison person from the FOCAS Research Institute to be assigned	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Behaviour **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant women** • **Postgraduates** • **People with disabilities**	• Aggression • Violence • Stress • Bullying • Harassment • Voice injury including voice trauma, chromic hoarseness, laryngitis etc. due to shouting / straining by lecturers	• DIT Dignity at Work: Anti Bullying & Harassment Policy in place • Employee Assistance Programme (EAP) in place provided by VHI for all DIT employees • Occupational Stress Management Policy & Procedures in place • All incidents are reported immediately to FOCAS Management • DIT Disciplinary procedures in place • DIT Procedure in place for the Resolution of Disputes/Grievances • DIT training available on Stress Management, personal skills, voice use etc.	• Follow procedures in DIT's Dignity at Work: Anti Bullying & Harassment Policy • DIT IS and DIT Buildings Office to maintain multimedia systems • Contact IS and Buildings Office if problems arise with multimedia systems	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT IS** **DIT Buildings Office**	**Ongoing**

HUMAN FACTORS							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Personal Protective Equipment (PPE) **PPE used: Students:** • Lab coat • Safety glasses • Gloves • Face shield **Staff Members**: • Lab coat • Safety glasses • Gloves • Face shield **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with**	• Improper fit and use • Incorrect type • Poor maintenance • Lack of training • Exposure to physical or hazardous substances • Slips, trips and falls • Lack of awareness of PPE requirements • Contamination	• Appropriate selection of PPE • Consultation with Supervisors/technical staff • Inspection and maintenance of PPE • All personnel are responsible for laundering their own lab coat and having safety glasses • Defects reported to laboratory co ordinator/ FOCAS Technical Support • Training, information and supervision from laboratory co ordinator/ FOCAS Technical Support • Signage in place where PPE is required e.g. on lab doors • Personnel are not permitted into the lab	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **Academic Supervisors**	**Ongoing**

	disabilities		without the relevant PPE • Personnel are supervised by laboratory co ordinator/ FOCAS Technical Support to ensure the wearing of PPE • Follow manufacturer's instructions • PPE: personal use only				

CHEMICAL							
Ref	**Hazard**	**Hazard Potential & Consequences**	**Control Measures**		**Risk H/M/L (with controls)**	**Person(s) Responsible**	**Target Date / Status**
			Current Controls	**Further Actions Required**			
	Gas **Gases in use;** **Who is harmed:** • **Staff members** • **Students** • **Visitors** • **Contractors** • **Young persons** • **Pregnant** • **Postgraduates** • **People with disabilities**	• Gas leak • Fire • Explosion • Suffocation • Carbon monoxide poisoning • Asphyxiation • Oxygen may promote flammability in other materials • Toxic/Exposure to gas	• Inspection, Testing and Maintenance/Servicing • Adequate ventilation • Staff attend training by BOC • Registered installer used for all installations, maintenance etc. • Training, information and supervision • Minimum quantities stored on site; gas piped in from outside where possible • Cylinders are stored in an upright manner and chained to the bench or trolley • Cylinders, regulators and associated equipment are kept clean and free from grease, oil and other contaminants A regulator is used when connecting to a lower pressure system • Cylinders are never rolled	• Maintain standards	**With current controls: L** **With Actions applied: L**	**FOCAS Research Institute Personnel** **DIT Buildings Office**	**Ongoing**

			along the floor/ground. Trolleys which are suitable are used • Leaking or damaged cylinders or those which cannot be properly identified must not be used • Damaged or unidentified cylinders must be returned to the supplier • Members of staff required to move cylinders are trained in manual handling				

FOCAS RESEARCH INSTITUTE SPECIFIC HAZARDS RISK ASSESSMENT

1. **Hazard: Radiation**
2. **Hazard: Lasers**
3. **Hazard: Use of Chemical Agents/Substances**
4. **Hazard: Storage of Chemical Agents/Substances**
5. **Hazard: Transport of Chemical Agents/Substances**
6. **Hazard: Chemical & Clinical Waste/Disposal**
7. **Hazard: Fumehoods/Fume Cupboards**
8. **Hazard: Gas Chromatography Mass Spectrometer**
9. **Hazard: Biological Agents**
10. **Hazard: Sharps, Surgical Blades, Syringes etc.**
11. **Hazard: Microtomes & Microtome Knives**
12. **Hazard: Bunsen Burners**
13. **Hazard: Rubber and Plastic Tubing**
14. **Hazard: Laboratory Refrigerators, Freezers & Fridge-Freezers**
15. **Hazard: Mercury Thermometers**
16. **Hazard: Spillages**
17. **Hazard: Microscopes**
18. **Hazard: Water Baths**
19. **Hazard: Glassware**
20. **Hazard: Hot Plates & Heat Stirrers**
21. **Hazard: Ultra Violet Light Sources (UV Light Box) & Trans-Illuminator**
22. **Hazard: Autoclave**
23. **Hazard: Chemical Laboratory Areas**
24. **Hazard: Biological Laboratory Areas**
25. **Hazard: PC Controlled Bench Top Instruments**

Hazard: Radiation

1.1 DIT Radiological Controls

The DIT regulates the use of all ionizing radiation in the safety document titled *Manual of Regulations for the safe use of sources of ionising radiation, Dublin Institute of Technology, Version 5 - 2011 (reviewed annually and updated as required)* . The Code of Practice set out in this document addresses the management, organisation and control of radioisotopes and related equipment on Campus. The DIT satisfies National and International official Regulations controlling ionising radiation. This document covers all relevant issues relating to health and safety including:

- Lines of communication within DIT and with the Radiological Protection Institute of Ireland
- Duties and responsibilities of the Radiological Protection Officer (Dr. Jacinta Browne, School of Physics), the Deputy Radiation Officer (Dr. Steve Meaney, School of Biological Sciences) and the DIT Radiation Advisory Committee
- General rules regarding the use of sealed sources of ionising radiation
- Monitoring of work areas
- Purchasing procedures radioisotopes and ionising equipment
- Disposal of all waste
- Log book of all radioactive sources purchased and current stocks
- Staff, postgraduate and undergraduate Student instructions and rules
- Copies of required authorisation forms

The DIT Radiation Advisory Committee administers and advises on all matters relating to radiation safety within DIT, including the FOCAS Research Institute. This Committee is responsible for ensuring that safe practices are established and maintained. This Committee works in close liaison with Radiological Protection Institute of Ireland (RPII). The DIT has an up to date site license issued by the Radiological Protection Institute of Ireland for the use of radioisotopes and related equipment on campus.

Risk Assessment: Medium **Exposure:** Low

1.2 X-ray Systems in the FOCAS Research Institute

A low voltage and low current X-ray system is routinely used in the FOCAS Research Institute. The ionizing radiation from these X-ray systems is < 1 mSv/h at a distance of 10 cm and therefore considered safe once the following procedures are followed;

- X-ray system must be treated with care; tampering must be avoided
- Sign and date the logbook related to the X-ray system's use.
- Prior to use of the X-ray system have read and signed the relevant sections of the Local Rules and the X-ray system Safety Guide, which are kept and maintained by the laboratory co-ordinator on behalf of the RPO/DRPO.
- No eating, drinking or smoking is permitted in the laboratories

The XRD cannot be removed without prior approval by the RPO / DRPO and the RPII and should only be moved under supervision of the RPO / DRPO.

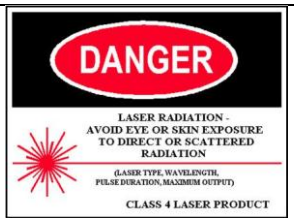
Additional Information

Additional information may be obtained in the ***Manual of Regulations for the safe use of sources of ionising radiation Version 6, 2012.*** Further information can be found under the Radiological Protection Act, 1991(Ionising Radiation) Order, 2000 (S.I. No 125 of 2000).

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**
Person(s) Responsible: **FOCAS Research Institute Personnel**
Target Date/Status: **Ongoing**

Hazard: Lasers

Laser Classification

LASER	Description	Examples	Warning Sign
Class 1 Laser	Do not emit hazardous radiation under normal conditions. Higher powered laser systems may be Class 1 as the light produced is enclosed and inaccessible. Interlocks prevent accidental access to the beam. Safe.	Laser printer Laser disc player	
Class 2 Laser	Low powered lasers <1 mW, which emit visible laser light. Considered reasonably incapable of injuring personnel because of the blink response of the eye. Staring into the laser can cause damage. Limited to visible radiation 400 nm to 700 nm.	Visible continuous HeNe lasers. Some laser pointers.	
Class 2A Laser	Special purpose lasers that emit accessible visible laser light with less than 1 mW radiant power. Can cause injury when viewed directly for more than 1,000 seconds.	Bar code readers.	
Class 3A Laser	Power levels of 1 to 5 mW: no hazard when viewed for momentary periods with the unaided eye. Pose sever eye hazards when viewed through optical instrument such as microscopes, binoculars or other collecting optics.	Visible continuous wave HeNe lasers. Solid state laser pointers.	
Class 3B Laser	Power levels 5-500mW for continuous wave lasers, >10 J/cm² for a 0.25 second pulsed laser. Hazardous if viewed directly (includes intra-beam viewing/specular reflections). Viewing unfocused pulsed laser radiation by diffuse reflection is not hazardous.	HeNe Ar ion Nd: YAG N	
Class 4 Laser	High power systems >500 mW for continuous wave lasers or >10 J/cm² for a 0.25 second pulsed laser. Presents serious eye and skin hazard, and can ignite flammable targets, create hazardous airborne contaminants and have a potentially lethal high current high voltage supply.	Note: DIT does not currently have Class 4 Lasers.	

Hazards
The main problems associated with Lasers are:

- **Electrical hazards** e.g. shock, explosion, fire
- **Eye hazards** e.g. ocular damage, inappropriate safety goggle use (leading to goggles shattering or melting), damaged goggles (pitted lenses offer no protection)
- **Skin damage** e.g. burns, carcinogenesis, Erythema, skin cancer, accelerated skin ageing
- **Contact with toxic materials** e.g. laser dyes can be toxic and carcinogenic.
- **Contact with coolants** e.g. cold burns
- **Fire beam hazard** e.g. ignition of a material that cannot withstand the laser output
- **Ultra Violet Radiation** (spectrum between visible light and X-rays)
    - Effect of exposure is determined by dosage, wavelength, portion of the body exposed and sensitivity of the individual.
    - Effects include damage to the skin and eyes.
    - Short-term effects e.g. sunburn
    - Long-term effects e.g. keratoses, skin cancers, premature skin aging and eye damage (photo conjunctivitis and photokeratitis after prolonged exposure, and cataracts and pterygia after repeated exposure)

Governing Legislation
The Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 2, Chapter 5, No 73

Control Measures
General

- Warning sign to be posted in laboratory and on laboratory door when laser is in operation (see table for signs)
- Access to the room shall be controlled. Only competent personnel shall operate the laser
- The illumination of the area should be as bright as practicable in order to constrict the eye pupils of experimenters
- Where practical, the laser system or beam should be enclosed to prevent accidental exposure to the beam
- Regardless of the laser Class - Never look into the primary beam
- Do not align a laser using the eye as this could cause retinal damage to the user
- Clear all personnel from the anticipated path of the beam
- Shields shall be used to reduce reflection
- All unnecessary shiny surfaces shall be removed e.g. shiny jewellery
- Windows/light sources outside the room shall be adequately covered
- Active lasers shall not be left unattended unless part of a controlled environment
- Warning devices should be installed for lasers with invisible beams to warn of operation
- Beams should terminate at a beam stop
- <u>All laser beams of Class 2 or higher should be kept at waist height at all times.</u> Where this is not possible the beam should be enclosed. <u>With Class 3b this is a legal obligation</u>
- A laser should be isolated from areas where personnel would be attracted by its operation. Doors shall be closed to keep out unwanted onlookers. For lasers above Class 3b this restricts access to authorised personnel and a sign on the door should indicate this
- Protective clothing shall be worn where deemed necessary and where risk of skin damage
- All materials in the path of the laser shall be of a material than can withstand the laser output. Cloth used in laser installations shall be fire retardant

Eye Exposure and UV Control Measures

- Minimise eye exposure
- Use appropriate eye protection
- Eye protection devices specifically designed for protection against radiation from the laser system in use should be used when engineering and procedural controls are inadequate to eliminate potential exposures
- The eyes and skin should not be exposed to direct or strongly reflected UV radiation
- A hazard warning sign must be affixed on the doors of laboratories etc. which have ultraviolet light installations
- Adequate eye and skin protection must be worn when working in an irradiated area. Safety glasses with side shields or goggles with solid side pieces must be worn. Skin protection is afforded by face shields, caps, gloves (elbow length if necessary), gowns, etc.
- Lasers 3b or above: goggles must be work when the laser is in operation. The choice of goggle depends on the power, repetition rate, exposure duration and laser wavelength. Goggles shall fit over spectacles. Defective eye protection shall not be used. Goggles shall be labelled with the optical density and the wavelength(s) the goggle protection relates to

Specific Class 4 Laser Control Measures

NOTE: FOCAS Research Institute DIT does not currently have Class 4 Lasers but may in the future and will ensure all control measures below are in place.

- Class 4 lasers shall be operated in a laboratory specifically designed for their use
- Only authorised access shall be allowed
- Where possible, the entire beam path including the target area should be enclosed. Enclosures should be equipped with inter locks so that the laser system will not operate unless such enclosures are properly installed
- Where the entire beam path has not been closed, reflective surfaces shall be removed. Safety latches or interlocks should be used to prevent unexpected entry into the laser controlled area. This allows rapid egress by the laser personnel and rapid access in an emergency situation
- A panic button should be installed
- Eye protection, which protects against laser radiation, should be used when engineering and procedural controls are inadequate to eliminate potential exposures
- Whenever possible, the laser system should be fired and monitored from remote locations.
- An alarm system, for example an audible sound or non-laser warning light, visible through protective eye-wear, or a verbal countdown command should be used prior to laser activation
- Any Class 4 laser or laser system should be provided with an operative keyed master interlock or switching device. The key should be removable and the device should not be operable when the key is removed
- Operation shall not take place in an atmosphere contaminated with smoke or dust
- Backstop material should be diffused and of such colour or reflectivity as to make positioning possible, but minimise reflection

Light Source Control Measures

- Lasers above Class 3b should only be operated by persons competent in their use
- Staff and students using Class 3b or above shall undergo a training exercise in laser safety before commencing work on lasers

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Use of Chemical Agents/Substances

Risks

- Illness, injuries from exposure

Control Measures

General

- Chemical agents risk assessments will be carried out for activities which are of such a duration or so frequently performed or involving such hazardous chemicals as to pose a risk of exposure to staff or students. Following the risk assessment measures may be specified to ensure that the risk is reduced to the lowest possible level. Measures may include substitution of one chemical for a less hazardous one, restricting the number of persons using or in contact with the chemical, engineering controls such as the use of a fume hood, training or the use of personal protective equipment
- Each laboratory must keep an up to date printed copy of all safety data sheets (SDS) for chemicals stored or used in that laboratory. When new chemicals are ordered, the relevant SDS should be requested from the supplier. The SDS must be readily available to all laboratory users
- Before new chemicals are ordered, personnel must ensure that safer alternatives have been investigated. A safer alternative could be purchasing a solution rather than making up a stock from a hazardous dust
- Personnel must be familiar with the contents of the SDS and bring to the attention of others the hazards associated with the chemicals
- Personnel must be aware of the spillage clean up procedures for the chemicals they use on a regular basis. Spill kits are supplied in each laboratory
- Laboratory co-ordinators should have a list of the toxic chemicals in their laboratory and make sure they are stored appropriately
- First-aid kits, eyewash stations and trained first-aiders are available in each laboratory
- All personnel with access to the FOCAS Research Institute are required to have first aid, manual handling and emergency response training

General storage of chemicals

- Ensure that all containers are in good condition, properly capped, and properly labeled.
- There should be no unlabeled container, and NO container should ever be labeled using the word WASTE or SPENT.
- Solutions or chemicals stored in containers other than their original container or waste must be labeled with the name of the chemical, the concentration if relevant, the hazard warning (e.g. toxic, corrosive, flammable etc.), the name of the person responsible for making up the solution, the date the solution was made up and expiry date
- Store incompatible chemicals separately. Safety Data Sheets also provide information on incompatibility
- Do not store chemicals in alphabetical order without consideration for chemical compatibilities. An alphabetical system may cause incompatible materials being stored next to one another (e.g. butadiene next to bromine or chlorine)

Flammables

Flammable and combustible chemicals are materials which, under standard laboratory conditions, can generate sufficient vapors to cause a fire in the presence of an ignition source. Materials which generate sufficient vapors to ignite at temperatures below 38^{o}C are "flammables," whereas materials that require temperatures above 38^{o}C to provide sufficient vapors for ignition are "combustibles."
The following precautions should be observed when using these materials:

- Flammable materials must be stored in a flammables cabinet. The door of the cabinet should be kept closed when not in use
- Segregate flammables from oxidizing acids and oxidizers
- Volumes of flammables stored should be kept to a minimum.

- Consideration should be given to letting the supplier deliver flammables 'just in time'
- Flammables in glass Winchesters should not be left on the bench in sunlight as they are likely to reach their flash point and cause an explosion and fire
- Flammables must not be stored in fume hoods where there is a bunsen burner or other heat source
- Secure screw caps on containers immediately following dispensing
- Do not dispense into beakers and leave at bench top level. Flammables and combustibles should be placed in a fume hood as soon as possible and used
- Do not allow flammable liquids to evaporate in a fume hood as a means of disposal
- Eliminate ignition sources such as open flames, hot surfaces, operation of electrical equipment, and static electricity from areas in which flammable or combustible materials are used or stored
- Refrigerators and freezers used for the storage of flammable and combustible liquids must be non-sparking (Ex rated)
- Ensure that there is proper bonding and grounding when transferring between metal containers or dispensing a flammable liquid from a large container or drum.

Personal Protective Equipment

- Safety glasses must be worn at all times in the laboratories containing hazardous chemicals
- Laboratory coats must be worn at all times when using hazardous chemicals
- Where there is a risk of a hazardous chemical splashing into the eyes, safety glasses must be worn with side protection. Ordinary corrective spectacles do not provide sufficient protection. Staff who wear spectacle will be provided with safety glasses that fit over their own glasses or prescription safety glasses
- Laboratory co-ordinators must ensure that personnel wear appropriate eye protection
- Contact lens wearers should alert laboratory co-ordinators to that fact so that appropriate first-aid can be provided in the event of an eye injury
- Laboratory co-ordinators should ensure that the correct types of gloves are selected for work with hazardous chemicals. Latex gloves are not used in laboratories

Safety Equipment

- Where eyewash basins are installed, these must be tested at least once per term. It is good practice to operate the eye wash station at least once per week
- Eye wash bottles must be checked regularly to ensure they are in date. If the seal is broken the bottle must be replaced
- Fume hood efficiency will be tested on an annual basis by registered contractor

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Storage of Chemical Agents/Substances

Storage includes:

- **Laboratory Chemical Presses**

Risks:

- Fire
- Explosion
- Reactions due to incompatible chemicals/solvents etc.
- Slips, trips and falls
- Incorrect use of substances due to incorrect labelling

Laboratory Chemical stores

- Chemicals are stored to a prescribed segregation protocol based on the UN system
- Flammable materials are stored in flame-proof cabinets in chemical stores
- Small volumes of solvents are kept in metal cabinets in storage areas in labs
- Incompatible chemicals are stored separate from each other

Cleaning Chemicals

- Toilet cleaners etc. are stored in designated areas
- Employees are instructed to read labels and adhere to the safety precautions prescribed

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Staff and Students**

Target Date/Status: **Ongoing**

Hazard: Transport of Chemical Agents/Substances

Risks:

- Exposure to chemicals

Control Measures:

- PPE such as white lab coat and safety glasses worn and students are supervised
- Gloves are worn where necessary
- Hazardous substances are transited in a suitable container

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Chemical & Clinical Waste/Disposal

- **Solid waste** e.g. contaminated gloves, paper towels, cotton wool, disposable loops, tissue culture bottles, Petri-dishes, flasks and disposable pipettes etc.
- **Liquid waste** e.g. solvents, microbiolological waste, aqueous waste
- **Sharps** e.g. broken glass, pipettes, scalpel blades, small glass vials, tips and ampoules, sharp pieces of metal
- **Mixed wastes** e.g. Biohazard waste containing solvents

The following bags/containers are used in the FOCAS Research Institute:

Yellow Contaminated (hazardous) waste
Black Uncontaminated waste

- **Black Bags**
  Black bags are used for uncontaminated waste such as instrument printouts and paper which has not come into contact with blood. These are incinerated. No glass or sharps must be placed in these bags.
- **Sharps Container**
  All sharps (including broken glass, needles) must be placed in sharp bins. Do not overfill the containers as this makes it impossible to close them in a safe manner. These are incinerated.
- **Incineration**
  All waste for incineration is brought to the foyer where building maintenance management will collect and store them until they are collected by "Healthcare Waste Management Services" for incineration. They are labelled with numbered tags provided by the company. Maintenance assign numbered tags to the laboratories which are logged.
- **Glass**
  Large items of used uncontaminated glass are placed in a container for collection by a buildings maintenance management.

Risks:

- Cuts from sharps e.g. pipettes, slides etc.
- Incorrect storage of waste materials
- Contamination
- Infection
- Spillages, slips, rips and falls
- Accumulation of materials on benches, floors etc. leading to slips, trips and falls

Control Measures:

General

- Contaminated waste is placed in an approved UN biohazard bag or sharps bin
- Hazardous waste is tracked by the laboratory co-ordinator
- All waste chemicals are disposed of using an accredited disposal company and the C1 cert is retained by the person requesting the disposal and a copy given to the safety representative.
- Waste is stored in labelled bins in the foyer until removal by the buildings maintenance management
- A copy of documentation from the waste management company is kept on file in the FOCAS Research Institute by the person requesting the disposal and a copy given to the safety representative
- When purchasing chemicals, attention should be paid as to how waste will be disposed of. Volumes purchased should be kept to a minimum to prevent the build up of surplus chemicals for disposal.
- Waste chemicals must be noted in the waste manifest in the laboratory with the chemical name(s), concentration and hazard warning label as well as the name of the person responsible for production/disposal of the waste.
- Flammable wastes should be stored in a flammables cabinet

- Do not dispose of hazardous waste down the drains
- Heavy metals should not be mixed with oil or waste solvents
- Do not mix aqueous waste with organic solvent- based waste
- Paper, gloves, cardboard, and other solid materials must not be mixed in with liquid wastes
- Hazardous waste must not be allowed to accumulate in laboratories. The laboratory co-ordinator should arrange for disposal with the School of Chemical & Pharmaceutical Science on a regular basis
- Non hazardous chemicals such as buffers may be washed down the drain
- Chemical waste can be mixed only if the chemicals are compatible and will not result in a hazardous reaction

Segregation of Wastes

Waste for disposal should be divided into the following categories:

- Neutralised waste
- Chlorinated solvents
- Non-chlorinated solvents
- Mercury wastes
- Oxidizing agents
- PCB wastes
- Reactive chemicals
- Waste oil
- Wastes with heavy metal contamination

The proper segregation of waste chemicals is essential to promote safe storage of those chemicals as well as to facilitate the economical disposal of the chemicals. The list in Appendix 5 sets out potentially incompatible wastes, waste components, and material along with the harmful consequences of mixing those materials together. This list does not include every possible hazardous chemical reaction, but should only be used as a guide. The list indicates the potential consequences of the mixing of a **Group A** material with a **Group B** material. The lists of chemicals in Groups A therefore should be kept separate from those chemicals in Groups B: See appendix 5

Avoiding smells from drains:

- Much distress can be caused by smells from drains due to volatile solvents and smelly substances entering the drains.
- Please think about what is going down your drain - especially drains in fume-hoods, as you may be unaware of the smell that is escaping.
- Laboratory Co-ordinators should make sure that sink and drain traps are refilled regularly with water to prevent drain odours escaping

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Fume Hoods/Fume Cupboards

Risks

- Exposure of personnel to hazardous substances because of incorrect use, fan failure, filter blockage, spillages, accumulation of materials in the fumehood, etc.

Control Measures

- Personnel are trained in the use of the fumehood
- Personnel receive safety induction from laboratory co-ordinator
- Risk Assessments are completed for hazardous tasks carried out in the fumehood: indicated in the CRA
- All incidents, including defects, are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Fumehoods are classified and given a hazard use rating in accordance with this table:

FUME CUPBOARD HAZARD RATING SCHEME		
HAZARD RATING*	**Exposure Limit (ppm or g/m^3)**	**Minimum Face Velocity (m/sec.)**
Class 1 - Slight	Over 100	0.4 - 0.6
Class 2 - Moderate	5 – 100	0.5 - 0.75
Class 3- High	Under 5	0.7 - 1.0

**** Note:*** *This rating may be revised with the issue of the new British Standard for Fumehoods/Cupboards*

- For the above classification scheme to work, it is necessary to know the face velocity of a particular fumehood, in order that its classification can be assessed. Once this has been done, a notice can be affixed to the front and side of the fumehood, indicating its average face velocity at various sash heights, together with an indication of some of the substances which can be used therein to give a general indication to staff of its suitability for different categories of hazardous substances.
- It must be possible to close the sash quickly without any risk of disturbing the apparatus within the fumehood.
- The sash opening is not set above that at which the face velocity has been measured
- Air flow meters and fan failure warning devices are incorporated into each fumehood
- The sash shall be kept closed at all times except during set up procedures
- Hazard warning signs are posted in the laboratory when hazardous operations are in progress
- The rate of release of toxic or flammable vapours is minimised by experimental design or by the use of reduced amounts of reagents
- All fumehoods conform to latest BS-EN specification and are maintained to the same standard
- Face velocities at the fumehood entrance, at maximum opening, shall be tested regularly, recorded and should be no less than 0.5m/sec averaged out over the opening. (Ensure that the supply of air to the room is also in excess of the total exhaust of all hoods plus the general room exhaust)
- A preventative maintenance programme is carried out by a registered contractor annually. In case of fire in the fumehood, the fumehood must be turned off
- No work is carried out in a fumehood that is used or rated as a ventilated storage cabinet (i.e. airflow <0.4mls) or has unnecessary equipment stored within
- The laboratory co-ordinator or researcher involved ensures the fumehood is suitable for the chemicals being used e.g. volatile oxidants, Perchloric acid or perchlorates. Hoods designated for these chemicals shall be clearly marked
- Spillages in the fumehood are cleaned up immediately using the correct procedure by a competent staff member
- Fume cupboards should never used as ventilated storage areas for chemicals. The proper functioning of fume hoods depends on a free flow of air through the unit and bottles, boxes, and equipment prevent this from occurring. (If chemicals *must* be stored, install ventilated shelves beneath the fumehood)

- Do not block the area at the back or the front airfoil with bench liner material or other objects
- Apparatus located within the fumehood shall be raised to allow free air passage under it e.g. via legs or using blocks.
- Factors that may adversely reduce the efficiency of the cupboard e.g. location near a door, passing traffic, incorrect sash position, storage of materials and equipment inside, use of centrifuge, hot plate or heat sources etc. must be considered
- After use:
    - Correct shutdown is carried out
    - The fan is run with the sash closed for a suitable period before switching off fumehood
    - All services are turned off and all substances/reagents returned to their designated storage area
    - All apparatus is removed and cleaned before replacement in designated area
- Personnel are trained in manual handling and apply their training

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Gas Chromatography Mass Spectrometer

Risks

- Fire as a result of high temperatures of manifold on Mass Spectrometer and from oven
- Electrical: risk of electric shock and subsequent serious injury during maintenance/repair
- Chemical exposure from use of solvents
- Burns as a result of contact with oven

Control Measures

- All incidents are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained fist aiders and a first-aid kit are available in the laboratory
- All personnel wear PPE such as laboratory coat and safety glasses
- Students are instructed on the use of the instrument prior to use
- Instrument is serviced and service records are available in CREST
- Correct storage of all chemicals used by instrument
- Area around instrument is kept tidy allowing access at all times
- Only qualified personnel operate machine
- The Helium gas ***must*** be left on at all times to preserve the column

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Sharps, Surgical Blades, Syringes etc.

Risks

- Cuts, lacerations and punctures of the skin from careless handling, usage or disposal
- Infection from hazardous chemicals or organisms entering the body

Control Measures

- All incidents (cuts, lacerations, punctures etc. of the skin) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed.
- Trained fist aiders and a first-aid kit are available in the laboratory
- Personnel are instructed and supervised in the use of sharps/instruments e.g. razor blades, scalpel blades, scissors etc.
- Personnel receive safety induction from Laboratory Co-ordinator and a safety laboratory manual
- Surgical scalpels are held only by the handle and stored in a safe place
- Pliers are used to remove corroded scalpel blades or tight fitting hypodermic needles from a holder or syringe. (Eye protection shall be worn when doing this as scalpel blades are very brittle and easily fragment under force)
- Surgical scalpels are held only by the handle and kept in a safe place
- Scalpel blades are held in forceps/pliers when being inserted into the handle or removed from it. New blades are pushed or pulled away from the body, not towards it.
- New needles and sharps are handled with the protective covering in place. Caps are not replaced on used needles. Users dispose of needles directly to the sharps container.
- Syringes and syringes without a needle attached must all go into a sharps container. Razor blades, lancets, scalpels, broken contaminated glassware and any other contaminated items that could cut or pierce the skin must also be placed in a sharps container
- Sharps containers for disposal of these items should be conveniently located and easily accessible in all work places in which sharps are used
- Needle caps are left in place until use
- Scissors are used instead of blades where possible when cutting
- Hands are not used to retrieve needles from vessels, instead the container is emptied onto a flat surface, and forceps are used to transfer needles
- Sharpness of a blade is never tested with a finger. Knives are held by the handle away from the edge of the bench and attempts to catch a falling blade are not permitted.
- A designated storage area for all sharp instruments is available
- Suitable storage is available or safety pins
- Blades are wrapped/sheathed and stored appropriately
- Designated puncture-resistant sharps containers are used for the disposal of all needles, blades and other sharps
- Sharps are never disposed of with regular waste or in regular rubbish bags
- Needles and syringes are rendered unusable by destroying them with pliers, and placing them into the sharps container.
- Sharps containers comply with the latest BS EN Specification for Sharps Containers.
- Sufficient sharps containers are available in relevant areas/laboratories.
- Sharps containers are sealed when three-quarters full and disposal is arranged by the Buildings maintenance management.
- Broken glassware and sharps that may be contaminated with infectious materials should be cleaned up using mechanical means, such as brush and dust pan, tongs, or forceps. Broken glass should <u>not</u> be picked up by hand
- Contaminated needles must not be bent, recapped, or removed unless there is no feasible alternative

NOTE: Sealed, robust sharp boxes, duly marked may be disposed of in the central skip.

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Microtomes & Microtome Knives

Risks

- Cuts, lacerations and punctures of the skin from careless handling, usage or disposal
- Infection from hazardous chemicals or organisms entering the body

Control Measures

- All incidents (cuts, lacerations, punctures etc. of the skin) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed.
- Trained fist aiders and a first-aid kit are available in the laboratory
- Personnel are instructed and supervised in the use microtomes and microtome knives
- Personnel receive safety induction from lecturers and a safety laboratory manual
- Knives are carried in their cases to the microtome
- Knives are never manipulated unless it has a handle securely fastened to it. If the handle has been removed during sectioning, it is replaced before removing the knife from the microtome.
- Knives are never left on the microtome. After use, knives are returned to their cases. If possible, microtome knives should be sharpened by machine; if a knife has to be honed manually, the following points should be observed:

1. Slide the "back" on to the knife before removing it from the case.
2. Secure the hone well away from the bench edge and position your body against the bench edge.
3. Hone the knife using slow careful strokes. Never try to increase the speed of the strokes.
4. Take great care when wiping honing lubricant from the knife.
5. Put the knife in its case then remove the "back"

- Guards are provided to protect the operator from any part of the knife which may project from the microtome. In addition, electrical interlocks are fitted to prevent unexpected operation of any automatic microtome.
- Blood from specimens is never allowed make immediate contact with the surface of the skin, through the use of latex gloves. Serum shall always be considered to be potentially dangerous.

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Bunsen Burners

Risks

- Burns from contact with hot Bunsen Burner and/or hot tubing
- Gas leak from gas left on, damage to tubing etc.
- Fire from naked flame
- Back burn

Control Measures

- Central gas 'shut off' available
- All incidents (burns, defects etc.) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students receive safety induction from lecturers and a safety laboratory manual
- Bunsen Burner user wears a laboratory coat, and long hair is tied back etc.
- Prior to using Bunsen Burners the gas tubing is checked for damage and the ends are securely fixed onto the gas tap and the burner inlet. Damaged tubing is removed from use immediately
- Flammable materials in containers on work benches near Bunsen Burners must not exceed 50ml, and must be in covered containers at a distance at least 30cm from a lit Bunsen Burner or gas burner.
- Lit Bunsen Burners are never left unattended. They are turned off before leaving the laboratory or moving to another area of the laboratory
- When the Bunsen Burner is being used to sterilize equipment that has been dipped in alcohol, the excess alcohol must be allowed to run off the equipment prior to inserting it into the flame
- Because as flames may not be visible in strong sunlight, lights can be dimmed or blinds pulled in order to see the flame more readily
- Bunsen Burners are turned off or turned to the pilot (yellow) flame setting when not in use
- Vessels to be heated over gas burners are securely positioned on tripods or similar apparatus
- Heating of liquids is permitted in glass or Pyrex vessels only. The procedure is carried out in the fumehood where vapours/fumes are likely to be released. Flammable liquids are not heated to a temperature greater than their flashpoints
- Heated containers are not handled until they have cooled down
- Bunsen Burners can remain hot for a period of time. As a result, they must be stored safely so that others are aware they are still hot. Bunsen Burners should always be handled by the base and not the neck
- Bunsen Burners must be at a sufficient distance from the gas supply point and line that they do not pose a risk of melting or igniting same

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Rubber and Plastic Tubing

Risks

- Putting rubber tubing onto glassware
- Sudden release of gas or liquid resulting from defective tubing or incorrect securing of tubing to nipples/taps, which can lead to fire or explosion
- Release of hot liquids or mains water under pressure
- Various personal injuries
- Damage to property and structures
- Fire
- Aerosols

Control Measures

- All incidents (burns, defects etc.) are reported to the laboratory co-ordinator who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Personnel are instructed, trained and supervised in the use of rubber and/or plastic tubing
- All rubber and plastic tubing is checked periodically for cracks or other damage, prior to use. Replacement is made promptly where necessary
- Rubber tubing is not used on permanent installations connected to laboratory services. Clear Neoprene plastic tubing is used instead
- Excessive lengths of tubing which may lose their identity or which may trail and pose tripping hazards or which may trail into hot/corrosive areas are not used/permitted
- Tubing for use with organic solvents is chosen carefully. The suitability of material is checked for each solvent.
- Tubes to filter pumps and cooling circuits are secured by a jubilee clip fitting. The tube carrying the outflow is firmly anchored in the drain and free from danger of 'kinking'
- Personnel receive safety induction from laboratory co-ordinator
- Fire blanket available in lab
- Running water and first-aid kit available for burns
- Appropriate PPE used/worn: lab coat, safety glasses, gloves
- Lab safety rules communicated and strictly adhered to
- Signage in place re unauthorised access to lab
- Emergency plans in place

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Laboratory Refrigerators, Freezers & Fridge-Freezers

Risks

- Reactions between chemicals/substances/materials where they are incompatible an stored together
- Release of vapours/fumes from chemicals/substances/materials
- Contact with materials due to overloading, inadequate labelling, incorrect storage/sealing of chemicals/substances/materials

Control Measures

- Samples are labelled and sealed in fridge
- Refrigerators, freezers and fridge-freezers are all 'Lec' or Ex-rated laboratory refrigerators, which are spark-free, lockable, have a temperature display, an alarm and automatic defrost
- Chemicals/substances/materials are stored correctly and refrigerators, freezers and fridge-freezers are not overloaded
- Chemicals/substances/materials stored are adequately labelled with labels stating the name, date of preparation/acquisition and person responsible with a water-resistant marker/pen
- Food and drink is not permitted in laboratory refrigerators, freezers and fridge-freezers, and signage is displayed on the outside of the units to this effect
- Defects and reported to the laboratory co-ordinator
- When power is due to be turned off, the DIT Buildings Office sends a communication and back-up generators are used to power laboratory refrigerators, freezers and fridge-freezers
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Mercury Thermometers

Risks

- Poisoning as a result of absorption through the respiratory tract or through unbroken skin. It has cumulative effects
- metallic taste, nausea, abdominal pain, vomiting, diarrhoea and headache as a result of high exposure concentrations
- Severe nervous disturbance, insomnia, loss of memory, irritability and depression as a result of chronic exposure (from continual exposure to small concentrations)
- Loosening of teeth, dermatitis and kidney damage as a result of severe prolonged absorption
- Chemical reactions e.g.
    - With ammonia to produce an explosive solid
    - It can cause severe corrosion problems because of its ease in forming amalgams

Control Measures

- Mercury spill kit on site

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Spillages

Risks

- Contact with materials
- Slips, trips and falls, and increased risk of exposure as a result
- Environmental damage

Control Measures

- Spill kits available on site
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

Spillages procedure and spill kits

- Spill procedure as per skill kit documentation
- Appropriate spill kit(s) in place

Contents of a Biohazard Spill Kit:

1. PPE: Safety glasses, a disposable white coat, apron, if required, appropriate gloves, safety glasses, shoe coverings, face mask for aerosols
2. A roll of paper towel
3. Fresh 10% bleach solution or other appropriate disinfectant
4. Spray bottle with disinfectant
5. Yellow biohazard bags or autoclave bags
6. Sharps container
7. Lidded container
8. Sign restricting access: time and date should be included
9. Incident report form (in foyer)

NOTE: Bleach/sodium hypochlorite loses its effectiveness upon storage, even in concentrated forms and is inactivated in the presence of organic materials. Bleach is also toxic; it denatures rubber and plastic materials, corrodes metal and bleaches fabrics. Materials containing bleach cannot be autoclaved.

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Microscopes

Risks

- Eye infection, eye strain from use
- Cuts from broken slides
- Infection, allergies from multiple users/shared use
- Manual handling injuries as a result of moving microscopes
- Musculoskeletal disorders from prolonged use with poor posture

Control Measures

- Glasses, contact lenses worn where necessary, slide imagine can be magnified as much as required. Eye pieces can be adjusted separately. When viewing slides at high magnification, students are instructed to start with the lens close to the slide and focus by moving the slide away from it
- Adequate lighting provided in the laboratory
- Spillages are cleaned up immediately
- Surfaces are wiped down regularly
- Good posture adopted and stool etc. adjusted to achieve a comfortable seating position. Elbows and wrists placed close to microscope
- Regular breaks taken and adequate time is given to students so no rushing is required
- All incidents (cuts, defects etc.) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Personnel are instructed and supervised in the use of microscopes
- Personnel receive safety induction from laboratory co-ordinator
- Personnel are adequately trained and are competent in the use of microscopes
- Hand-washing facilities available in the laboratory
- Sterile wipes are available for cleaning the eyepiece of the microscope

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Water Baths

Risks

- Burns and scalding from hot water and steam

Control Measures

- Baths are not left unattended and users must stand an no sit in the vicinity of same
- Water in baths is heated slowly to the desired temperature
- Baths are visually inspected prior to use. Damaged water baths are taken out of use immediately
- Spillages are cleaned up immediately
- Baths are allowed to cool before emptying
- All incidents (cuts, defects etc.) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Personnel are instructed and supervised in the use of water baths, and do not interfere with or lean over baths
- Materials added to the bath are removed using tongs
- Racks within the bath are not lifted/removed from the bath
- Baths are not overloaded
- Personnel receive safety induction from laboratory co-ordinator Staff are adequately trained and are competent in the use of water baths
- Hand-washing facilities available in the laboratory

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Glassware

Risks

- Cuts, from damaged or broken glassware e.g. from forcing tubing, teats or bungs into glass tubing, pipettes or condensers which break
- Cuts for flying or ejected pieces of glassware
- Exposure to hazardous substances on contact with containers / receptacles
- Burns from contact with heated glassware

Control Measures

- Spillages are cleaned up immediately
- All incidents (cuts, burns, defects etc.) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Personnel are instructed and supervised in the use of glassware
- Personnel receive safety induction from laboratory co-ordinator Staff are adequately trained and are competent in the use of glassware
- Care is taken in the storage and washing of glassware and specific glassware racks are available in the wash-up area in laboratories
- Hand-washing facilities available in the laboratory
- Use plastic as an alternative to glassware whenever possible
- Glassware is visually inspected before use, glassware wit cracks, breakages, scratches, chipped etc. is reported to the laboratory technician or lecturer immediately and the glassware is not used
- Glassware is not stored near the edge of work benches in the laboratory
- Great care is taken when using/handling glassware including:
    - Inserting pipettes into pipetting aids or Pasteur pipettes into teats
    - Attaching glass to or removing glass from rubber or plastic tubing
    - Removing "frozen" stoppers from glass bottles
    - Breaking glass tubing
    - Washing up glassware
    - Handling broken glassware
- When handling glassware force or excessive pressure should not be applied
- When inserting pipettes into pipetting aids or Pasteur pipettes into teats; attaching glass to rubber or plastic tubing; or removing "frozen" stoppers from glass bottles, glassware should be held in a cloth to help prevent slipping and hands kept as close together as possible
- When fitting glassware to tubing, water or glycerol may be used and the plastic tubing softened by brief immersion in hot water
- Glass vessels under vacuum should be enclosed in plastic or wire mesh to prevent fragments being scattered if implosion occurs
- Hot glassware is treated with care and put in a place of safety so that no individual can access it until it has cooled
- Ground glass connections are lubricated before assembling and disassembled immediately after use
- Flasks or containers are never stoppered when hot
- Where a glass stopper seizes, the container is never heated
- Running is not allowed while carrying glassware
- Broken glassware is carried in suitable cages/trays and placed in the sharps container and never the general waste bin.

Risk: H/M/L:
With current controls: L
With actions applied: L

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Hot Plates & Heat Stirrers

Risks

- Burns as a result of contact with hot surfaces
- Eye or skin damage as a result of splashing liquid
- Fire as a result of heating materials to high temperatures

Control Measures

- Spillages are cleaned up immediately
- All incidents (burns, defects etc.) are reported to the laboratory co-ordinator (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Personnel are instructed and supervised in the use of hot plates and heat stirrers
- Personnel receive safety induction from laboratory co-ordinator
- Personnel are adequately trained and are competent in the use of hot plates and heat stirrers
- Hand-washing facilities available in the laboratory
- Hot plates and heat stirrers are visually inspected before each use and damaged units reported to management and taken out of use immediately
- PPE worn includes laboratory coat and safety glasses
- Liquids are heated or stirred in glass or Pyrex vessels only
- Stirrers are turned on only after the container to be heated has been placed onto the plate
- Temperature and rotation speed should be increased gradually to prevent over-heating or splashing
- Flammable liquids must not be heated to a temperature greater than their flashpoints
- If the heating of liquids is likely to release hazardous vapours then the process must be carried out in a fumehood
- Hot plates and heater stirrers are not left unattended when in use
- Ensure that the electrical cable to the unit is not touching the hot plate during use
- Units must be switched off when not in use
- Hot plates must be serviced and maintained in accordance with the manufacturer's instructions
- Hot plates are not handled until they have cooled down. They can remain hot for a period of time. As a result, they must be stored safely so that others are aware they are still hot

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Ultra Violet Light Sources (UV light box: high intensity)

Risks

- Burns to skin
- Eye damage: buns to cornea resulting in temporary blindness

Control Measures

- Spillages are cleaned up immediately

Control

- Project risk assessments completed
- A UV face shield is worn when using the light box
- Long sleeves and gloves are worn.
- Risk is reduced because exposure times are low/short

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Autoclaves

Risks

- Burns or scalding as a result of careless handling of contents e.g. boiling liquids and hot materials, or contact with steam
- Cuts, lacerations etc. as a result of broken vessels on loading, opening of autoclave or unloading
- Contact with materials due to space constraints if backlog/incorrect storage occurs in storage area before autoclaving
- Exposure to vapours or fumes as a result of chemicals in the vessels in the autoclave
- Slips, trips and falls, and increased risk of exposure as a result of items stored incorrectly/insecurely on the floor before autoclaving
- Slips, trips and falls, and burns as a result of spillage of materials
- Various accidents during pressure testing or explosion where the door is not adequately secured
- Blockage of drains as a result of debris left in the autoclave

Control Measures

- SOP in place
- Materials are correctly stored and accumulation is not allowed to occur in the area designated for storage of materials before autoclaving
- Materials are stored on designated shelves, racks, trolleys and other suitable surfaces, and not on the floor
- Good housekeeping is maintained in the autoclave area
- An efficient schedule is in place for the autoclave to ensure no accumulation or backlog of materials to be autoclaved
- Personnel using the autoclave are trained and are competent in the operation of the autoclave
- A visual inspection is carried out before the autoclave is used. Defects are reported to management immediately and the autoclave is not allowed to be used until inspected by a competent person
- Autoclaves are serviced as required
- Instructions for use are displayed clearly on/adjacent to the autoclave
- If the autoclave is non self-filling staff check the water level before use and ensure it is topped up to the correct level
- Appropriate PPE i.e. lab coat, safety glasses and gloves are worn when loading the autoclave
- After autoclaving and before opening the door of the autoclave, ensure the unit pressure gauge is at zero and don their PPE such as heatproof gloves. This PPE is worn during unloading, as the contents can remain hot for a period of time. Materials are removed with care from the autoclave
- Trolleys, racks etc., are not overloaded with the contents of the autoclave
- Personnel are trained in manual handling and apply their training
- Spillages are cleaned up immediately using appropriate cleaning materials and PPE
- An interlock is present preventing the opening of the autoclave during operation
- Signage regarding the 'hot surface' of the autoclave is posted adjacent to the autoclave
- Bottles with screw caps are loosened before autoclaving, and care is taken with bottles after autoclaving as the contents may flow out
- Sharps are protected before autoclaving with adequate coverings
- Glassware is checked prior to placement in the autoclave to ensure there are no breakages/cracks. Broken/cracked glassware is not placed in the autoclave unless necessary and adequately protected
- All autoclave shall have the following fittings:
    - A suitable safety valve with a discharge system that is visible and/or audible and located where it will not cause harm
    - A suitable reducing valve to prevent the safe working pressure from being exceeded
    - A suitable isolating or stop valve on the inlet line in addition to any door interlocked safety valve
    - A well located suitable pressure indicating gauge
    - Suitable drain system where sediment or liquid is likely to accumulate

- Autoclaves are clearly and permanently marked with an identification number and maximum permissible working pressure. In addition, where the process liquid is a fluid at elevated temperature, it shall be marked with the maximum operation temperature, clearly shown on the temperature gauge
- Autoclaves are operated in accordance with manufacturer's instructions. Doors must be interlocked with a time delay device to ensure they cannot be opened until all residual energy has been dissipated
- The water level is maintained above the level of heating elements
- For front-loading autoclaves, staff stand in a position so that the door shields their body from the autoclave
- Where autoclaves are used for sterilising liquids in sealed glass containers a safety system must be in place to prevent the door from being opened until the temperature in all the containers have fallen to below 80^{o} C. This could consist of sensing probes or a time-activated door interlock
- Hazardous materials like phenolic disinfectants or cellulose nitrate must not be autoclaved
- Personnel are trained in manual handling and apply their training e.g. team lifting when moving the autoclave
- Trained first-aiders and a first-aid kit are available in the laboratory
- Autoclaves are turned off when not in use and are never overloaded
- Autoclaves comply with relevant CE; EN or BS standards
- Autoclaves are inspected, serviced and maintained in accordance with the manufacturer's instructions by the laboratory co-ordinator in conjunction with the DIT Buildings Office

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Chemical Laboratory Areas

Risks

- Risk of fire from flammable liquids
- Irritation and toxic response from individuals exposed to chemicals
- Injury due to incorrect use of instrumentation
- Cuts and lacerations due to contact with sharps
- Slips, trips and falls, and burns as a result of spillage of materials

Control Measures

- Under no circumstances are contact lenses to be worn in the laboratory
- Materials are correctly stored and accumulation is not allowed to occur in the area designated for storage
- Materials are stored on designated shelves, racks, trolleys and other suitable surfaces, and not on the floor
- Good housekeeping is maintained in the laboratory area
- Appropriate PPE is to be worn in the laboratory
- Buddy system is mandatory for laboratory work. Lone working is not permitted

In Case of Emergency

In the case of a *minor* incidence:

- Alert emergency services (dial 0 112)
- Neutralise the cause of the incidence
- Take local action immediately for minor personal injuries
- Fill out an incident report form

- In the case of a *serious* incidence:
- Alert emergency services (dial 0 112)
- Neutralise the cause of the incidence
- Move injured parties if possible to safety and evacuate area

Arrangements for evacuation

- A continuous alarm will sound
- All staff present act as wardens
- Secure area by turning off appliances and closing doors and windows, if possible.
- DO NOT TURN OFF LIGHTS
- Leave are without delay
- Proceed to nearest clear exit
- DO NOT USE LIFTS
- Assemble at the designated assembly point A (Back gate of Kevin St site)
    - DO NOT RE-ENTER UNTIL instructed

Arrangements for first-aid

- All users of Focas MUST complete the one day first aid training course
- First Aid and Eye Wash stations are available in all labs
- Decontamination Showers are available in labs.
- A list of qualified basic first aiders (and extension numbers) is posted in the main laboratory.

- If in any doubt or in the case of a *serious* incidence alert emergency services (dial 0 112)

Risk: H/M/L:
With current controls: L

With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: Biological Laboratory Areas

Risks

- Risk of fire from flammable liquids
- Irritation and toxic response from individuals exposed to chemicals
- Injury due to incorrect use of instrumentation
- Cuts and lacerations due to contact with sharps
- Slips, trips and falls, and burns as a result of spillage of materials
- Electric shock for instrument

Control Measures

- Under no circumstances are contact lenses to be worn in the laboratory
- Training on the instrument is required prior to use
- Good housekeeping is maintained in the laboratory area
- Appropriate PPE is to be worn in the laboratory
- Buddy system is mandatory for laboratory work. Lone working is not permitted

In Case of Emergency

In the case of a *minor* incidence:

- Alert emergency services (dial 0 112)
- Neutralise the cause of the incidence
- Take local action immediately for minor personal injuries
- Fill out an incident report form

- In the case of a *serious* incidence:
- Alert emergency services (dial 0 112)
- Neutralise the cause of the incidence
- Move injured parties if possible to safety and evacuate area

Arrangements for evacuation

- A continuous alarm will sound
- All staff present act as wardens
- Secure area by turning off appliances and closing doors and windows, if possible.
- DO NOT TURN OFF LIGHTS
- Leave are without delay
- Proceed to nearest clear exit
- DO NOT USE LIFTS
- Assemble at the designated assembly point A (Back gate of Kevin St site)
    - DO NOT RE-ENTER UNTIL instructed

Arrangements for first-aid

- All users of Focas MUST complete the one day first aid training course
- First Aid and Eye Wash stations are available in all labs
- Decontamination Showers are available in labs.
- A list of qualified basic first aiders (and extension numbers) is posted in the main laboratory.

- If in any doubt or in the case of a *serious* incidence alert emergency services (dial 0 112)

Risk: H/M/L:
With current controls: L

With actions applied: **L**

Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

Hazard: PC Controlled Bench Top Instruments

Risks

- Risk of fire from flammable liquids
- Irritation and toxic response from individuals exposed to chemicals
- Injury due to incorrect use of instrumentation
- Cuts and lacerations due to contact with sharps
- Slips, trips and falls, and burns as a result of spillage of materials
- Asphyxiation for gases
- Infection due to handling of biological hazardous material

Control Measures

- Under no circumstances are contact lenses to be worn in the laboratory
- Materials are correctly stored and accumulation is not allowed to occur in the area designated for storage
- Materials are stored on designated shelves, racks, trolleys and other suitable surfaces, and not on the floor
- Good housekeeping is maintained in the laboratory area
- Appropriate PPE is to be worn in the laboratory
- Buddy system is mandatory for laboratory work. Lone working is not permitted
- Ensure the room is well ventilated where gases are in use
- For handling biological samples all samples must be placed in laminar flow hoods when work is being carried out. The hoods should be switched on 15-20 mins prior to use to ensure sufficient airflow & to eliminate aerosols. All liquid waste will be disposed of safely by using disinfectants. Virkon is the most important disinfectant used in the NanoLab laboratory as it is proven effective against HIV/AIDS and Hepatitis B & all other viruses. A 1% solution is used for effective use. Liquid waste can be disposed of in the cell culture laboratory sink. All plastic waste & gloves will be disposed of in the yellow biohazard bins. Before leaving the laboratory hands must be thoroughly washed with anti-bacterial soap.
- All personnel must be trained on instrumentation prior to use
- Use of sharps will be restricted as far as possible. Any sharps used will be disposed of in the yellow "sharpak" bins provided in the laboratory, which are located under each laminar flow cabinet.

In Case of Emergency

In the case of a *minor* incidence:

- Alert emergency services (dial 0 112)
- Neutralise the cause of the incidence
- Take local action immediately for minor personal injuries
- Fill out an incident report form

- In the case of a *serious* incidence:
- Alert emergency services (dial 0 112)
- Neutralise the cause of the incidence
- Move injured parties if possible to safety and evacuate area

Arrangements for evacuation

- A continuous alarm will sound
- All staff present act as wardens
- Secure area by turning off appliances and closing doors and windows, if possible.
- DO NOT TURN OFF LIGHTS
- Leave are without delay
- Proceed to nearest clear exit
- DO NOT USE LIFTS

- Assemble at the designated assembly point A (Back gate of Kevin St site)
    - DO NOT RE-ENTER UNTIL instructed

Arrangements for first-aid

- All users of Focas MUST complete the one day first aid training course
- First Aid and Eye Wash stations are available in all labs
- Decontamination Showers are available in labs.
- A list of qualified basic first aiders (and extension numbers) is posted in the main laboratory.

- If in any doubt or in the case of a *serious* incidence alert emergency services (dial 0 112)

Risk: H/M/L:
With current controls: **L**
With actions applied: **L**

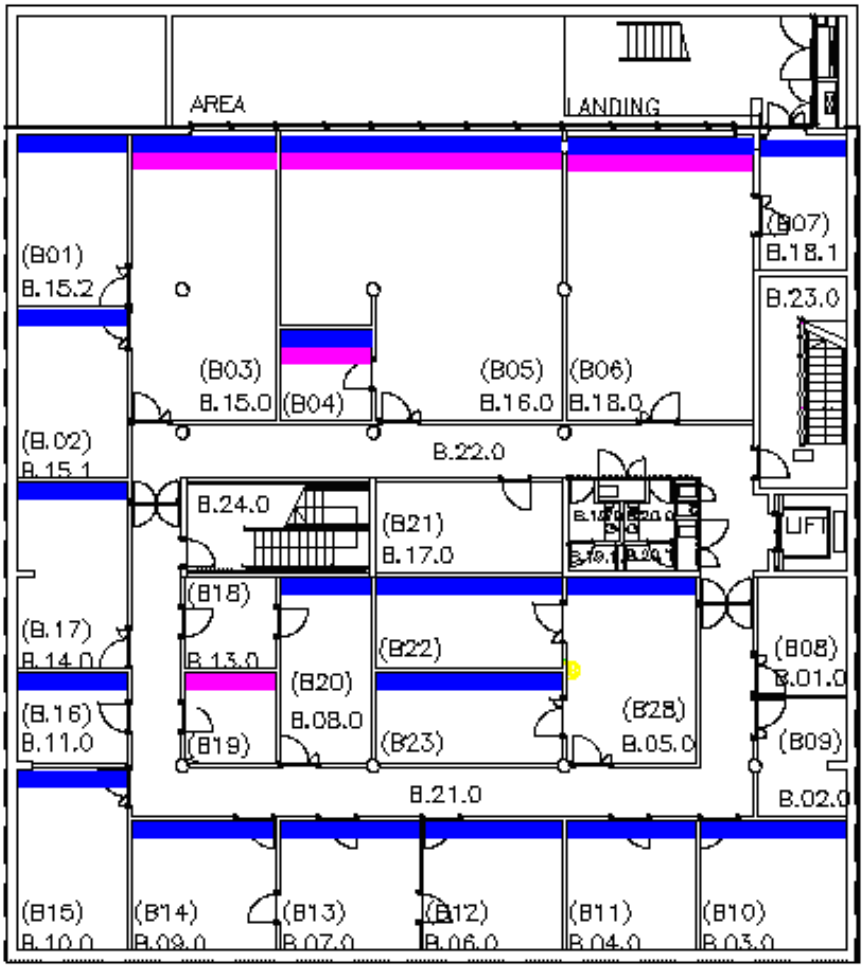
Person(s) Responsible: **FOCAS Research Institute Personnel**

Target Date/Status: **Ongoing**

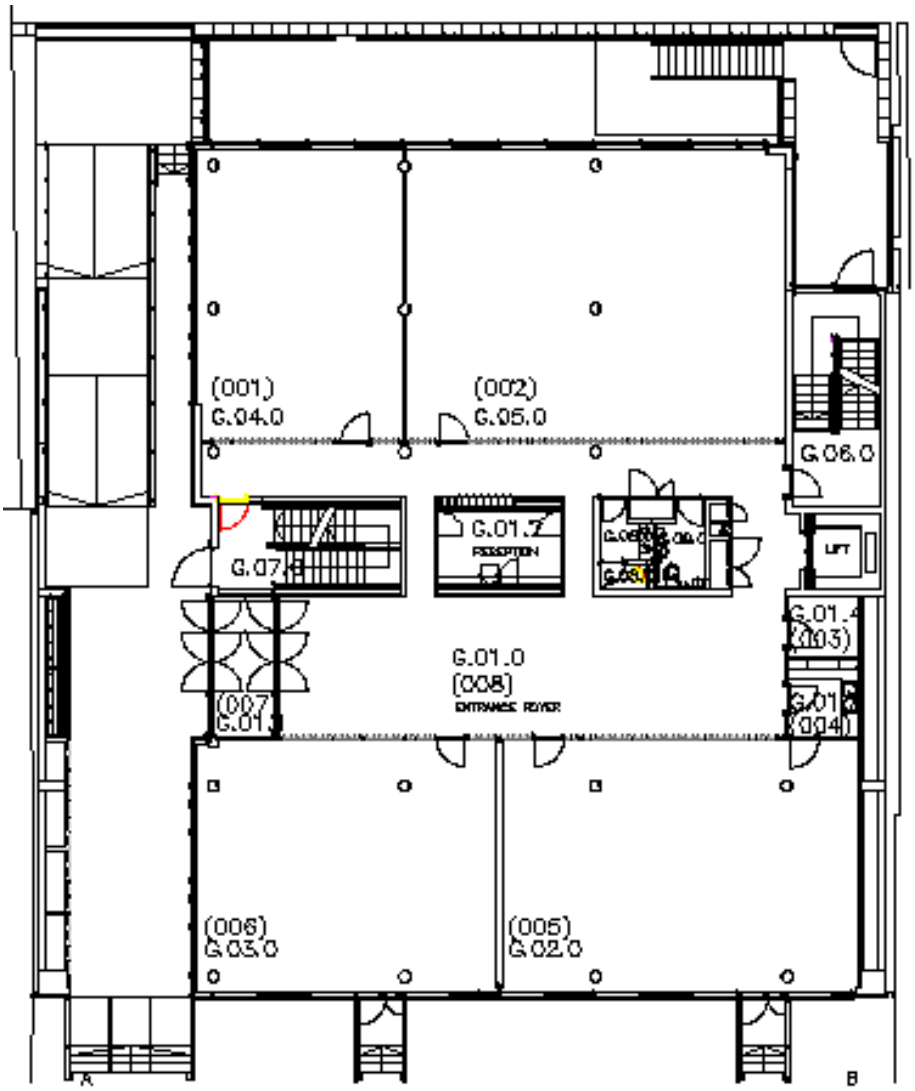
Appendix 1

FOCAS Research Institute Floor Plans

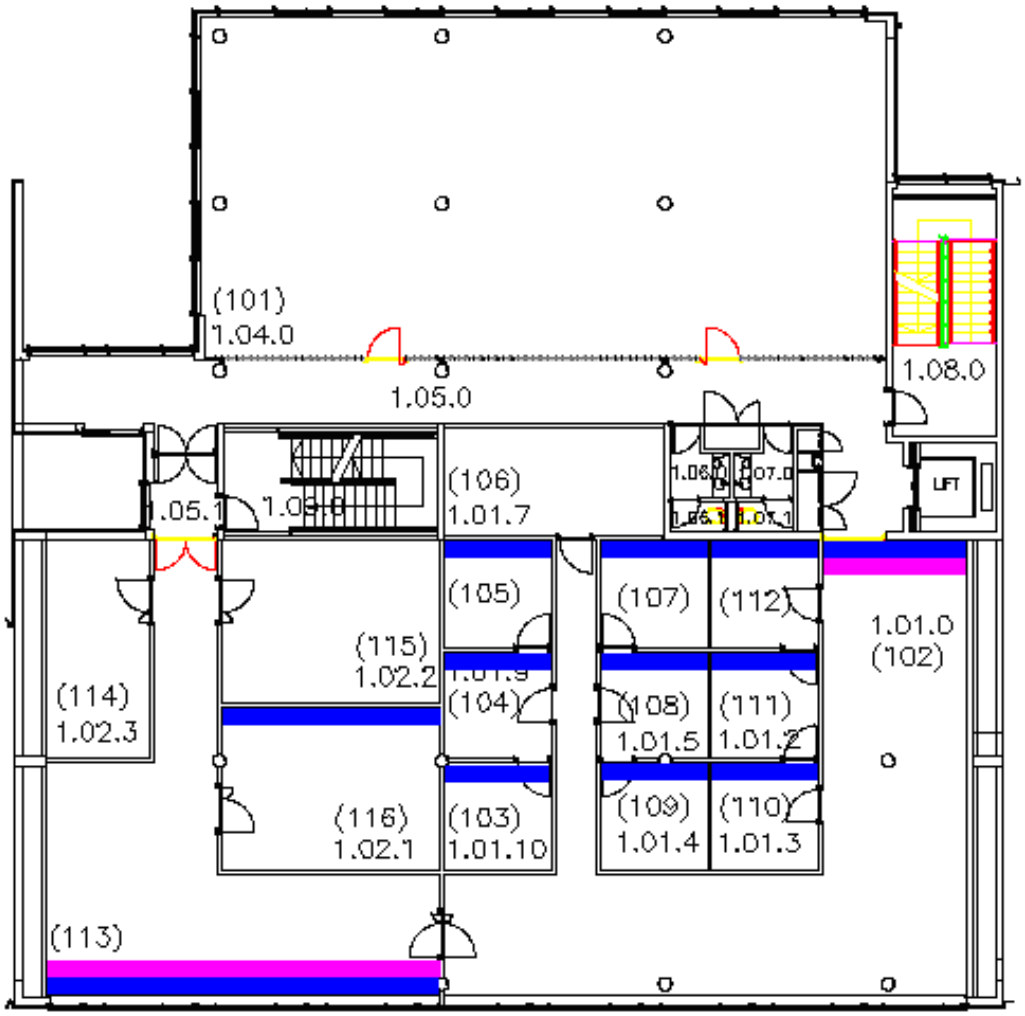
KEY:
Blue: indicates the presence of industrial gases
Pink: indicates the presence of chemicals



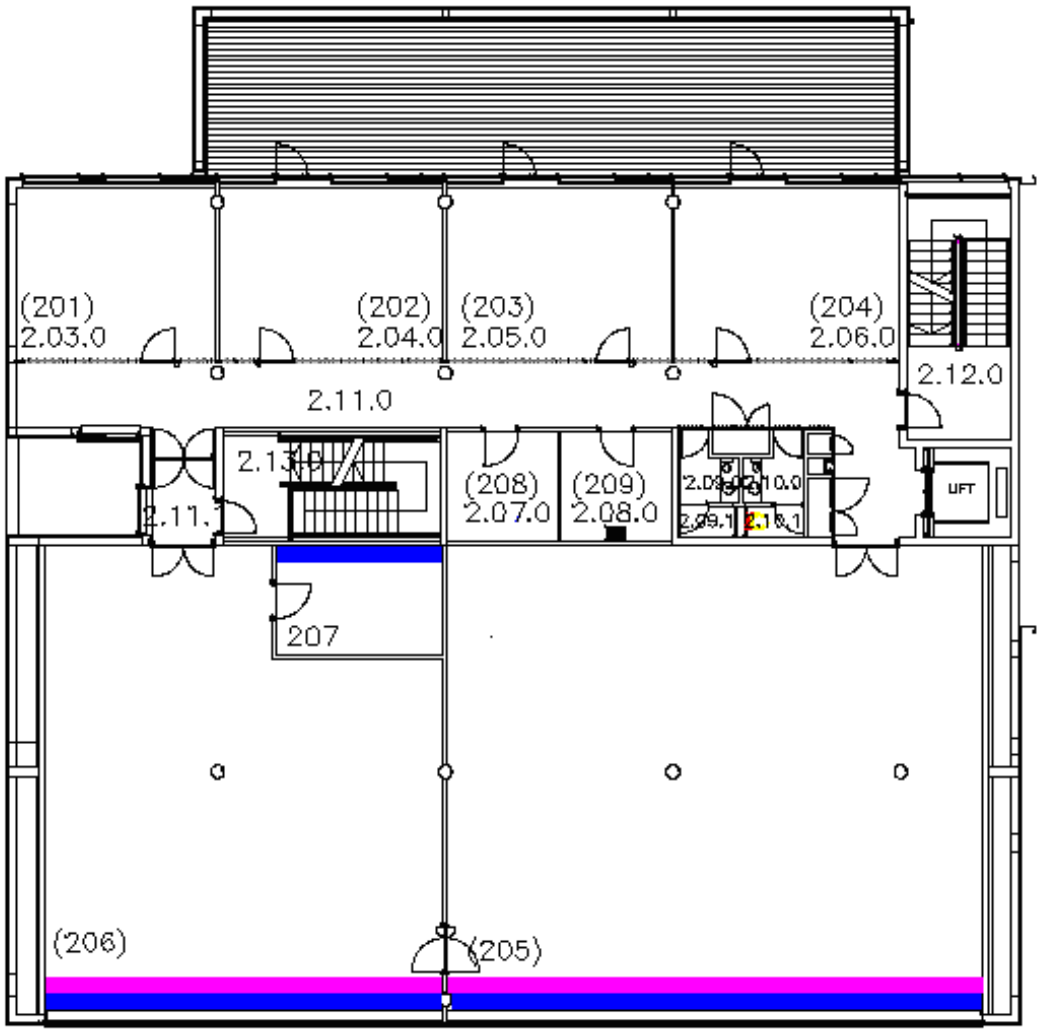
BASEMENT FLOOR PLAN ROOM NUMBERS



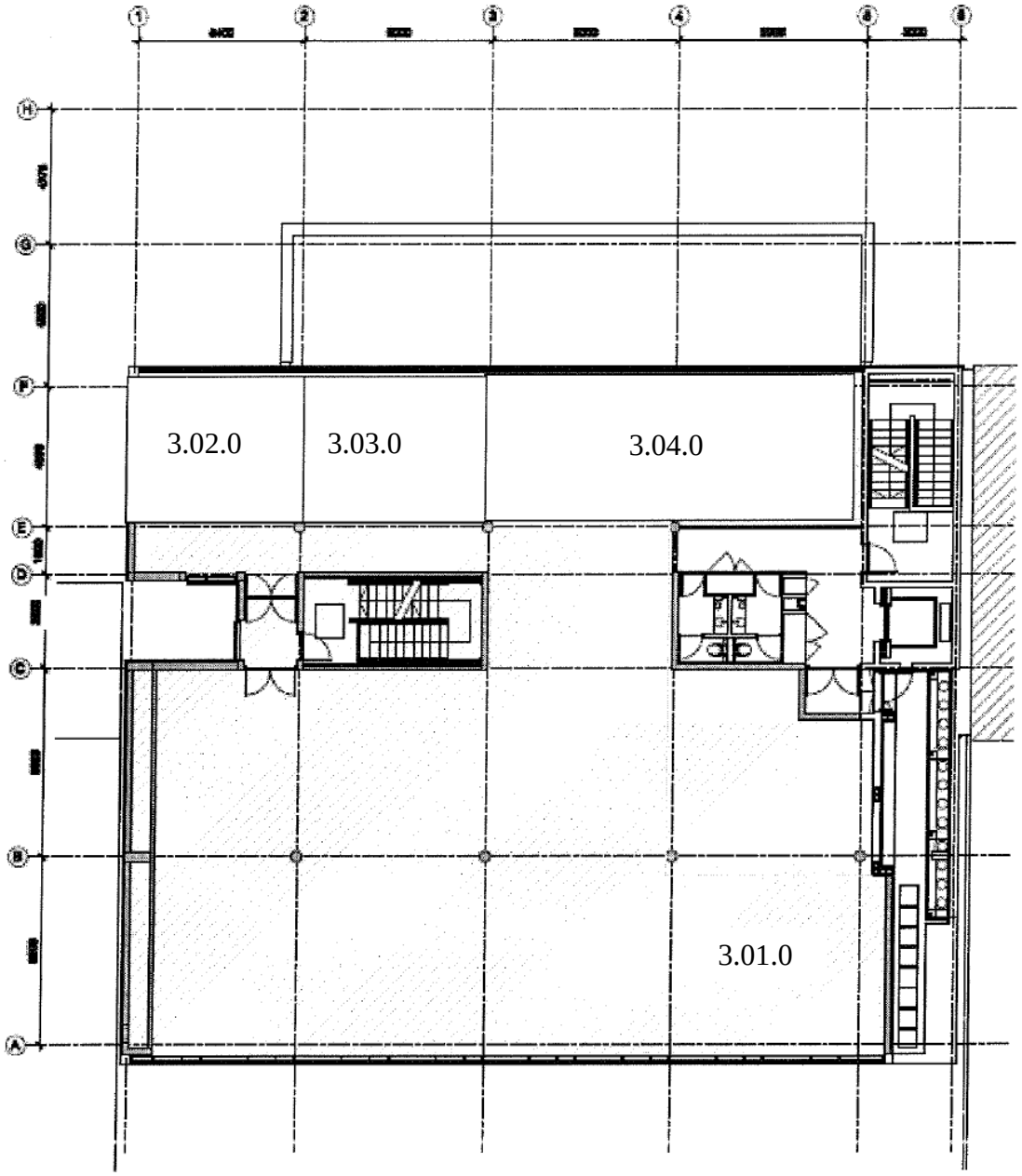
GROUND FLOOR PLAN ROOM NUMBERS


(101)
1.04.0
1.05.0
1.08.0
LIFT
(106)
1.01.7
(105)
(107)
(112)
1.01.0
(102)
(115)
1.02.2
(104)
(108)
1.01.5
(111)
1.01.2
(114)
1.02.3
(116)
1.02.1
(103)
1.01.10
(109)
1.01.4
(110)
1.01.3
(113)

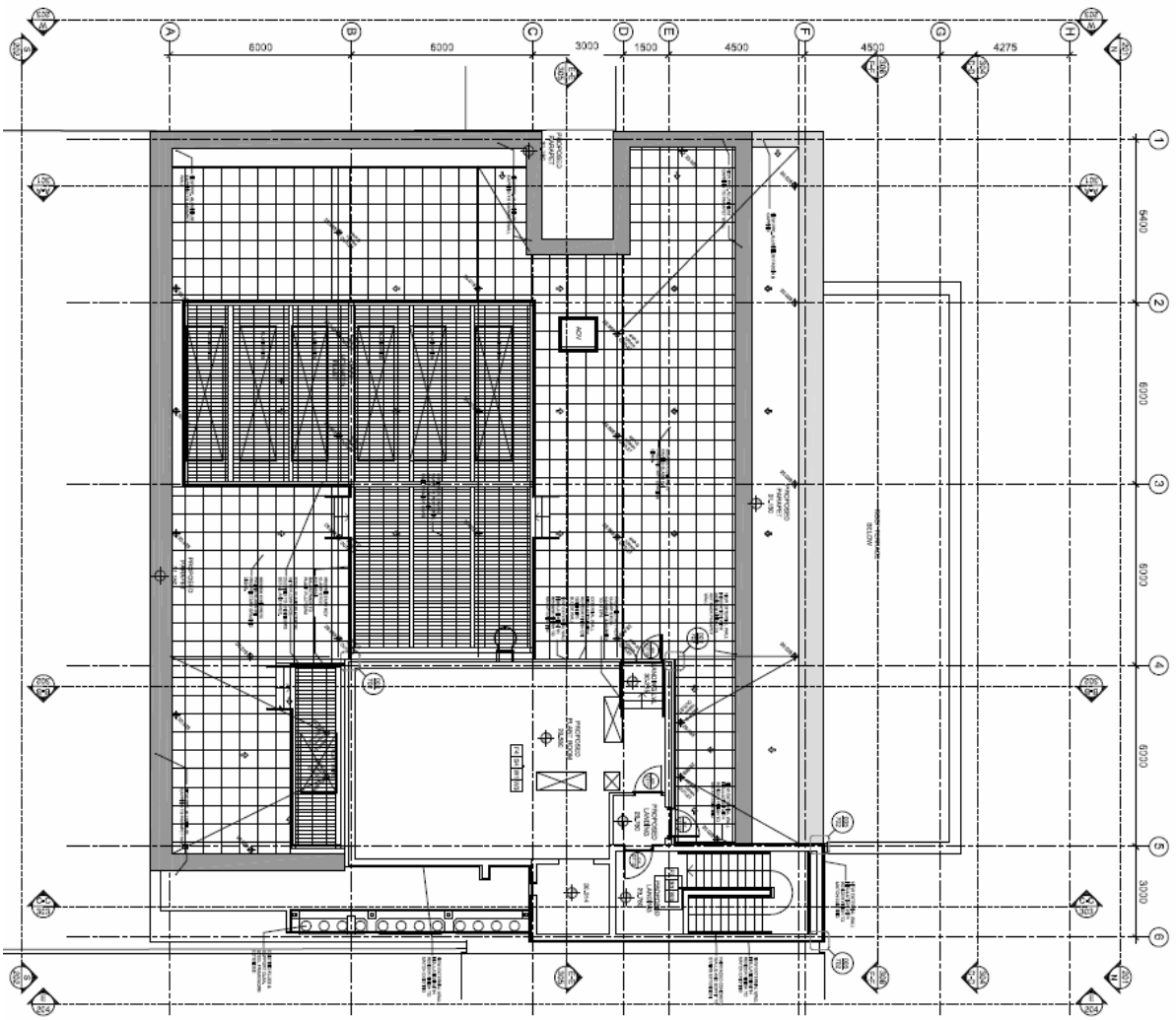
FIRST FLOOR



SECOND FLOOR PLAN ROOM NUMBERS



THIRD FLOOR PLAN ROOM NUMBERS



FOURTH FLOOR PLANT ROOM/ROOF

Appendix 2

FOCAS Research Institute SOP for Core Equipment

PE Lambda 900 UV-Vis/NIR Spectrometer

Getting Started:

- The PC should be left on at all times. However if the PC is off, it must be booted up prior to switching on the instrument to avoid communication issues.
- Switch the spectrometer on with the green button (back right corner on top on instrument and allow it to initialise for at least 10 minutes prior to use.
- Once the instrument has initialised, the software can be accessed by double clicking on the Lambda 900 icon on the desktop.

Running a Scan(s):

- The program opens on the method page. To run a scan, click on the appropriate method.
- Note: If any changes are made to the method, **DO NOT** save them either during use of the software or on exiting the software when your work is completed.
- It is recommended that you use the autosave function to save your data to your folder of choice on Distrib. If you do not know how to use this, contact Anne or Luke as detailed below.
- Please fill in the instrument log book (should be next to the PC) with the following details: User name and the date/time.
  Samples Run
  Any issues encountered

For Reference:

- When work is completed, please turn off the spectrometer but leave the PC running (switch off the monitor).
- Don't turn the instrument on and leave it on for a long period of time without use as the lamps have a finite lifetime. Commence work within 10 minutes of switch on.
- Also, ensure you remove cuvettes or other samples from the sample/reference holders when you have finished. In addition, don't leave samples or solvents on top of the instrument at any time.
- If you encounter any problems with the instrument, please report them to Anne Shanahan (Ext 7905) or Luke O'Neill (Ext 7906).

PE LS 55 Luminescence Spectrometer

Getting Started:

- Switch on the instrument and allow it to warm up for at least 15 minutes before using it.
- Turn on the PC
- Double Click on the FL WinLab Icon on the desktop to access the software, which will open up on the Method window.

Running a Scan(s):

- The Application Toolbar contains icons to give shortcut access to applications. Click on the icon to start the required application.
- To run a scan, double click on the appropriate method file name in the Method window. If you make any changes to the method, please **DO NOT** save them. *(The User Manual for the instrument is located on the shelf above the Spectropolarimeter in the Steady State Laboratory should any software assistance be required).*
- Save all spectra to a drive.
- Please fill in the instrument log book (next to PC) with the following details:

  User name, date and time used
  Samples run
  Data Collection Parameters

For Reference:

When work is completed, please turn off the instrument and the PC.
If you encounter any problems with the instrument, please contact Anne Shanahan (Ext 7905) for assistance.

Jasco J-810 Spectropolarimeter

Getting Started:

- Ensure the instrument is switched on.
- Switch on the PC and log on as detailed below
  User Name: steadystate
  Password: b05lab
- Start Spectra Manager by double clicking on the icon on the desktop. The Spectra Manager window will appear which displays the program menu used by the J-810 Spectropolarimeter.
- To start measuring, double click the required program from the displayed menu. This will start the Spectropolarimeter and will light the light source.
- Refer to the manual (on shelf above the instrument) for use of the software to perform spectrum measurements/analysis/etc.

Shutdown Procedure:

- To exit the spectrum analysis program
  File → Exit
- To exit the spectrum measurement program
  Measure → Exit

- To exit the spectra manager program
  Application → Exit
- Turn off the power to the main unit and shutdown the PC

For Reference:
If you encounter any problems with the instrument, please contact Anne Shanahan (Ext 7905) for assistance and make note of any error messages displayed in the log book.

Spectrum GX FT-IR Spectrometer

For Reference:

If you encounter any problems with the instrument, please contact Anne Shanahan (Ext 7905) or Luke O'Neill (Ext 7906) for assistance and make note of any error messages displayed in the log book.

Getting Started:

- Ensure the instrument is switched on.
- Open the software by double clicking on the Spectrum icon and log on
  User Name: Admin
  Password:
- Initialise instrument
  Set up → Instrument → OK
- After initialisation, the instrument set up dialog box will appear.
- Click 'Beam Path' Icon
  Click 'Update'
  Click 'Update' again
- Refer to the tutorials for information on running scans.
  Spectrum → Help → Learning Spectrum
- When work is completed, exit all programs and turn off the PC
- **DO NOT TURN OFF THE INSTRUMENT**

FT-IR Microscope

- Before using the Auto IMAGE Microscope to collect spectra, the MCT detector must be cooled as detailed below.
- Press down on the front edge of the flap which covers the Dewar.
  Lift the cap off the Dewar.
  Place the funnel into the opening in the Dewar.
  Fill the funnel with liquid nitrogen and allow it to drain
  Refill the funnel and continue in this manner until the nitrogen stops bubbling.
  Refit the detector cap and close the flap.

  Note: Please use the cryo gloves provided while handling liquid nitrogen

- Follow SOP for the spectrometer down as far as beam. Switch beam to microscope and click update and then update again.
- Switch on the Microscope and switch on the Stage Control Box.

- To operate the software, double click on the Auto IMAGE Icon
- The system will then initialise, make sure there is **NO** sample on the stage and that the ATR crystal (if fitted) is **RETRACTED.**
- Refer to the software tutorials for guide to scanning
  AutoImage → Help → Learning AutoImage
- When work is completed, redirect the beam to MIR, exit all programs and turn off the Stage Control Box, the Microscope and finally the PC.
- **DO NOT TURN OFF THE INSTRUMENT**

FTIR Micro-ATR Imaging Accessory

General Use:

- Click on **Instrument Set-up** icon on the toolbar (see image below).
- Then within the **Scan and Instrument** Set-up that pops up, chose **Beam** which will give you a schematic of beam direction.
- For use of the microscope, the beam will need to be directed through the microscope.
- To set the beam direction, click on the microscope icon and click **Apply**
- Log onto the Spectrum Image software (on PC desktop) and choose ATR Imaging as the Operation Mode. The ATR Register Crystal Position Wizard will start automatically.

  (i) Make sure the ATR Crystal Arm is clamped to the accessory pillars and that the dust cover (black sliding cover) is open.
  (ii) Use the optical microscope to find the line scribed along the upper surface of the arm.
  (iii) Move the field of view along the line and centre at the edge of the crystal well.
  (iv) Click **Move to ATR Crystal Position** (the visible window will show an image of the flat top surface of the crystal).
  (v) Centre and focus on the registration mark at the centre of the surface.
  (vi) Click **Finish** (the crystal axis is registered as the origin in the (X, Y) plane.

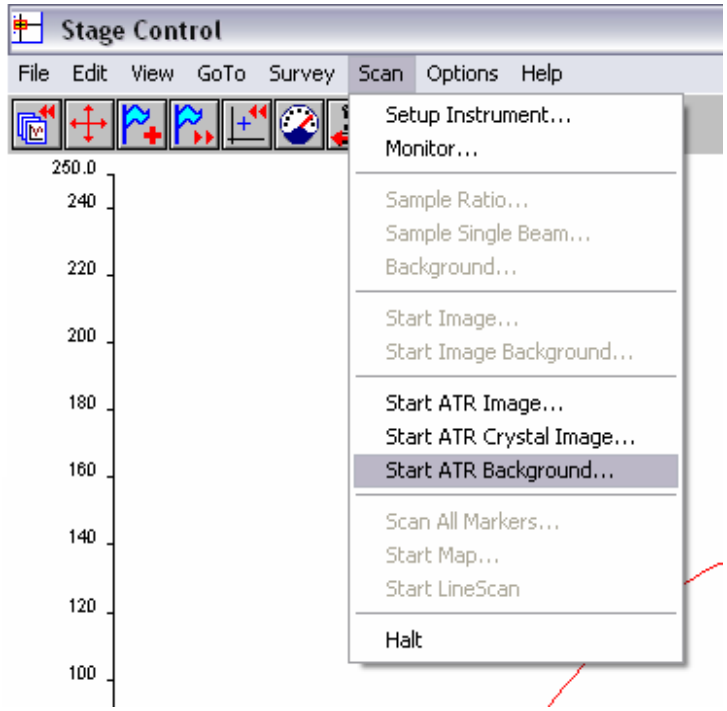
Preparing the Instrument for Collecting a Visible Image

1. Place the sample of interest onto the mini stage and centre as required. This will make it easier to get set up for sample imaging later on. It is not essential but you will need to take care not to adjust the stage in any direction except for Z.
2. Position the crystal arm so that the tip of the crystal is close to the height of your sample above the stage and clamp it at both ends.
3. Register the crystal position (as described previously) if you have not already done so.
4. Making sure the microscope stage remains at the origin in the (X, Y) plane, swing the crystal arm out of the field of view.
5. Use the Monitor Visible window to find and focus the sample on an area of interest (only use the joystick in the Z direction if required, use tweezers and centre the feature using the stage mini controls (two screws on the front of the stage platform with crosshead on it) Your feature is then centred at the origin in the (X, Y) plane.
6. In the Monitor Visible window, select **Copy Image to New Window** from the file menu.
7. Save as required

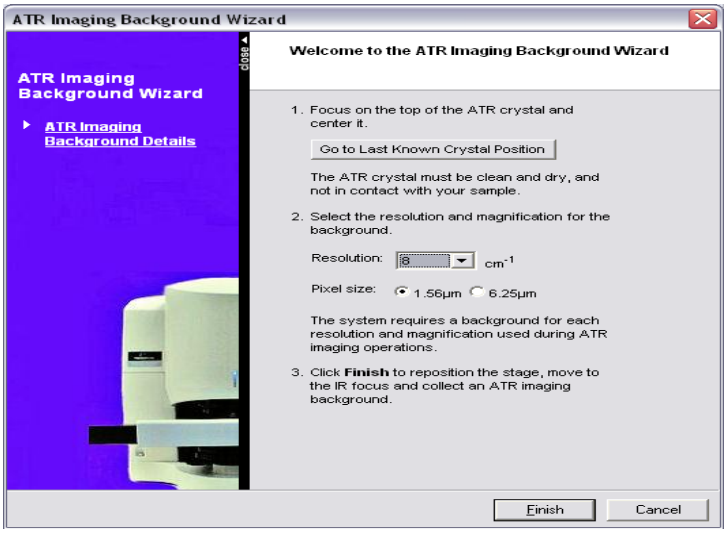
Collecting ATR Imaging Backgrounds:

1. If there is a sample on the mini-stage, raise the crystal arm to make sure that the sample is not in contact with the crystal.
2. Make sure the crystal arm is clamped and the crystal dust cover is open.

3. Select **ATR Background** from the **Scan** menu of the **Stage Control** window (see below).



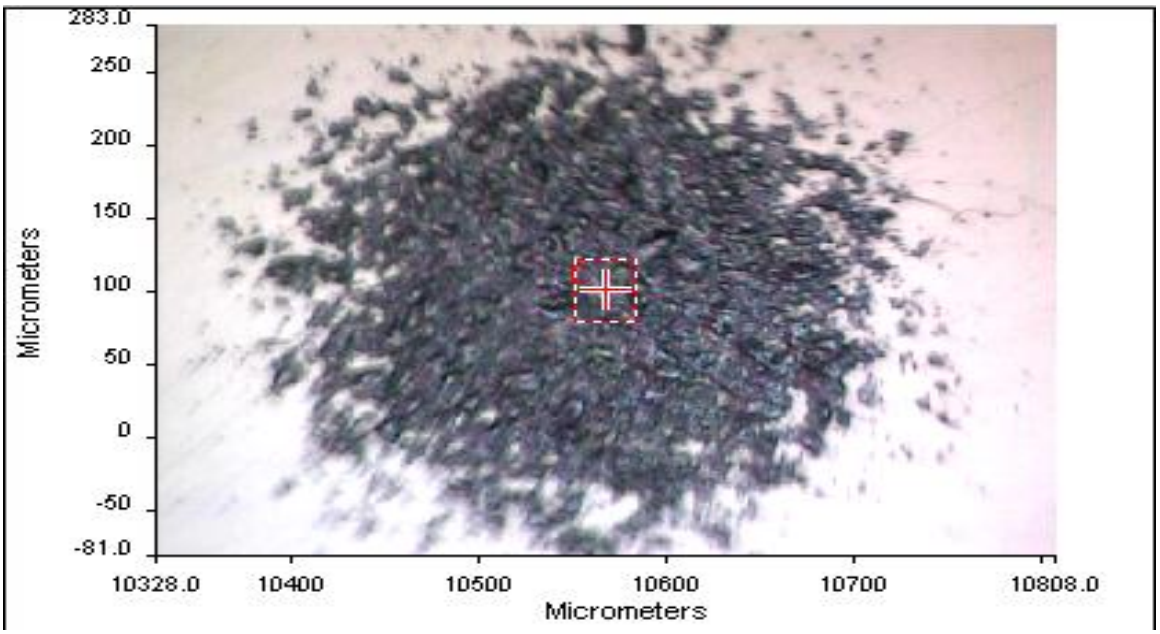
4: If the microscope isn't already focused on the registration mark on the top surface of the crystal, click on **Go to Last Known Crystal Position** (see overleaf).


ATR Imaging Background Wizard
ATR Imaging Background Wizard
ATR Imaging Background Details
Welcome to the ATR Imaging Background Wizard
1. Focus on the top of the ATR crystal and center it.
Go to Last Known Crystal Position
The ATR crystal must be clean and dry, and not in contact with your sample.
2. Select the resolution and magnification for the background.
Resolution: 8 cm-1
Pixel size: 1.56µm 6.25µm
The system requires a background for each resolution and magnification used during ATR imaging operations.
3. Click Finish to reposition the stage, move to the IR focus and collect an ATR imaging background.
Finish
Cancel

5: Focus on the registration mark on the top surface of the crystal.
6: Select the **Resolution** and **Pixel size** required and then click **Finish**
The system automatically focuses on the tip of the crystal and the ATR imaging background is collected and saved (see below).
7: Repeat this procedure for as many combinations of resolution and pixel size required.

Collecting an ATR Crystal Image:

1. If there is a sample on the mini-stage, raise the crystal arm to make sure that the sample is not in contact with the crystal.
2. Make sure the crystal arm is clamped and the crystal dust cover is open.
3. Select **Start ATR Crystal Image** from the **Scan** menu of the **Stage Control** window. The ATR Crystal Image Wizard starts.
4. If required, amend the **File Details** displayed as a sub—folder within the following **C:\pel_data\Spotlight\default**
5. Click **Next**. The Focus on the Crystal page is displayed.

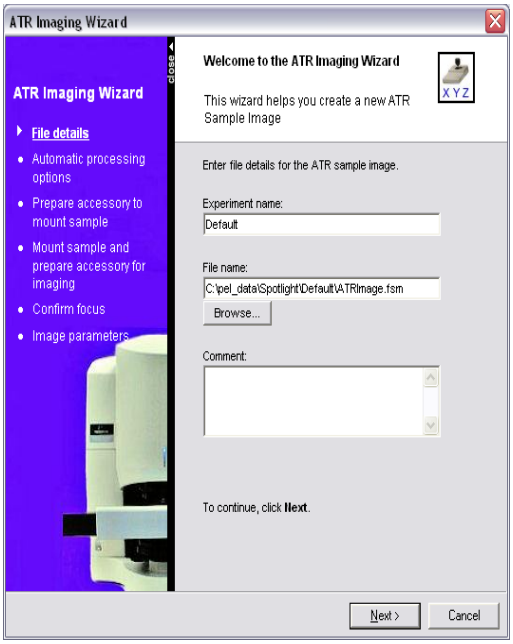


6: Focus on the registration mark on the top surface of the ATR crystal and click **Next**. The image parameters page is displayed.
Note: The joystick is now disabled so the stage cannot be moved.
7: Enter Image Parameters identical to those of your ATR sample images. The estimated file size and estimated duration fields are updated automatically.
8: Click **Finish.**
If the ATR crystal image file already exists you are asked to confirm that you want to replace it.
An estimate of the time needed to create the image and the approximate size of the file are displayed.
9: Click **OK**.
The ATR crystal image is collected and saved to the folder and filename specified in Step 4. By default it is **C:\pel_data\Spotlight\default\ATRCrystal.fsm**

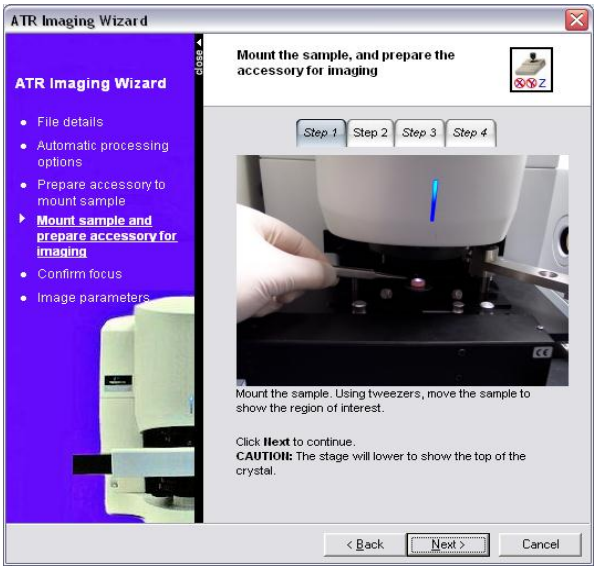
Collecting an ATR Sample Image:
Note: Before you start, ensure you have stored and ATR Imaging background for the Resolution and Pixel Size you want to use for your ATR sample image.

The ATR Imaging Wizard guides you through collecting an ATR image from your prepared sample. At certain points the stage control joystick is disabled for particular directions.

1: Select **Start ATR Image** from the **Scan** menu of the **Stage Control** window.
The ATR Imaging Wizard Starts

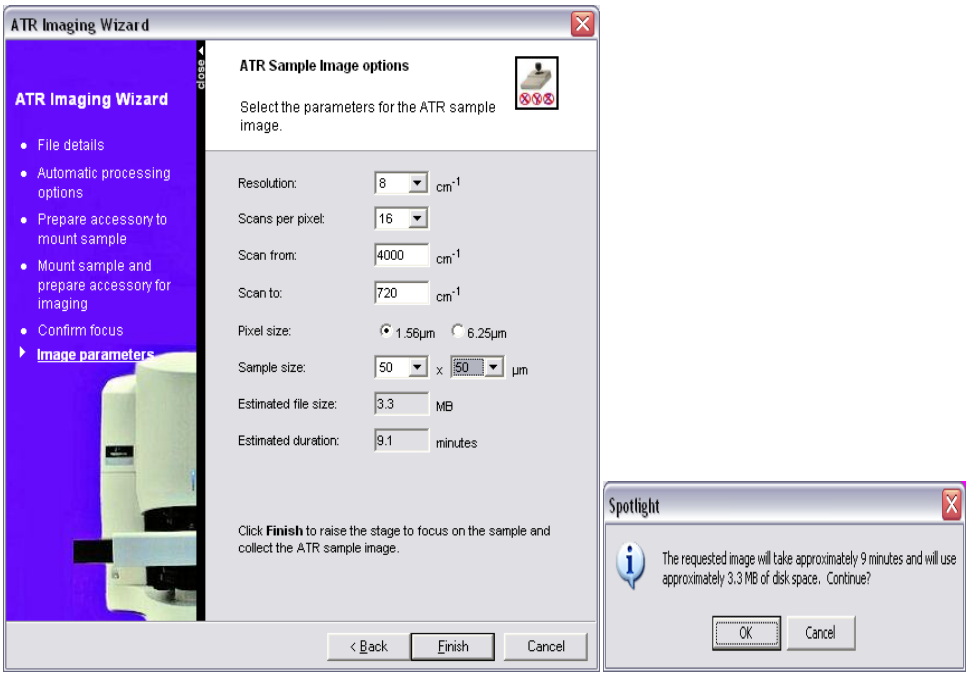


2: If required amend the file details displayed. If you enter an Experiment name the path for the File name is automatically updated. A new folder will be created if desired. **Note: Save your data within a subfolder of C:\pel_data\Spotlight\default**
3: Click **Next**. The **Automatic Processing Options** page is displayed.
4: Select **Subtract Crystal Image** or **Baseline Offset Correction** or **No Automatic Processing**.
5: If collecting a second or subsequent image from a sample that is already mounted in the accessory, select **Skip sample mounting**.
6: Click **Next.**
If you selected Skip sample mounting the Confirm focus page is displayed (move on to **Step 16**)
7: Before collecting a new ATR image, make sure the pressure applied to the sample by the mini stage for a previous image has been released by removing the force lever to the right.
8: Lift and swing the crystal arm away from the field of view.
9: Click **Next**.
The joystick is disabled in the (X,Y) plane so the stage can only be moved in the Z direction.


ATR Imaging Wizard
ATR Imaging Wizard
File details
Automatic processing options
Prepare accessory to mount sample
Mount sample and prepare accessory for imaging
Confirm focus
Image parameters
Mount the sample, and prepare the accessory for imaging
Step 1
Step 2
Step 3
Step 4
Mount the sample. Using tweezers, move the sample to show the region of interest.
Click Next to continue.
CAUTION: The stage will lower to show the top of the crystal.
< Back
Next >
Cancel

10: Click through Steps 1-4 to see images of how to place the sample on the mini-stage.
11: Place the sample on the mini stage.

12: Focus on the sample and then gently push the sample with tweezers to find the region of interest. Use the manual mini-stage adjusters to centre the area of interest.
13: Swing the crystal arm over the sample, lower the arm onto the accessory pillars until the crystal tip touches the sample and then clamp the arm at both ends.
14: Slide the force lever from right to left.
15: Click **Next**. (The confirm focus page is displayed).
16: Focus on the registration mark on the top surface of the ATR crystal. (The joystick will allow you to re-centre the mark in the field of view).
17: Click **Next** (the image parameters page is displayed).
18: Enter **Image Parameters** for the images you want to collect.
19: Click Finish (an estimation of time needed and approx file size is displayed, see below). Finally Click OK.


ATR Imaging Wizard
ATR Imaging Wizard
File details
Automatic processing options
Prepare accessory to mount sample
Mount sample and prepare accessory for imaging
Confirm focus
Image parameters
ATR Sample Image options
Select the parameters for the ATR sample image.
Resolution: 8 cm-1
Scans per pixel: 16
Scan from: 4000 cm-1
Scan to: 720 cm-1
Pixel size: 1.56µm 6.25µm
Sample size: 50 x 50 µm
Estimated file size: 3.3 MB
Estimated duration: 9.1 minutes
Click Finish to raise the stage to focus on the sample and collect the ATR sample image.
< Back
Finish
Cancel
Spotlight
The requested image will take approximately 9 minutes and will use approximately 3.3 MB of disk space. Continue?
OK
Cancel

Processing ATR Sample Images:

You can process an ATR sample image during data collection by subtracting your Baseline Offset Correction or in most cases your ATR crystal image, but you may prefer to process your images manually using one or more of the processing options available in the Spotlight software.

Spotlight 400 FT-IR Imaging Spectrometer

Getting Started:

- Ensure the instrument is switched on. If for any reason it isn't on, please contact either Anne Shanahan (7905) or Luke O'Neill (7906)
- Switch on the PC
- At the Windows XP Start Up Window, click on **Customer** and you will gain access to the PC.
- Open the software by double clicking on the Spectrum icon, where you will be prompted for a login. Select **Analyst** from the drop down list.
- You will then be asked to pick either:
  Instrument (80175)

Work Offline
- Chose **Instrument (80175)** unless you only want to look at previously recorded data.
- Click **Ok** and the software will open to the main screen.

General Use:
- Click on **Instrument Set-up** icon on the toolbar (see image below).
- Then within the **Scan and Instrument** Set-up that pops up, chose **Beam** which will give you a schematic of beam direction.
- For use of UATR or Standard Sample Set-up, the beam will need to be directed through either MIR or NIR.
- For use of the microscope, the beam will need to be directed through the microscope.
- To set the beam direction, click on where you need it to go and click **Apply**

Note: Installation of the ATR imaging accessory on the microscope stage has to be done by either Anne Shanahan (Ext 7905) or Luke O'Neill (Ext 7906). Please ensure we are notified of your requirements via the Instrument Booking Meeting on Mondays @ 12pm.

Scanning a Background using the UATR:

- Chose **Scan → Scan Type → Background**.
  You can choose scan range, number of scans and scan time here too.
- Give your scan a name, click **Apply** and click **Start.**
- You will be prompted for a background and shown a preview scan of the ATR crystal.
- **Click** Scan and allow it to run. When it is finished, it will show up as a full size spectrum, then save as required. There is a Data folder on the C Drive of the PC but it is advisable to save them onto a USB key as well.
- Recommend saving the files as both *.sp and *.asc

Scanning a Sample:

- Choose **Scan → Scan Type → Sample**
- You can choose your number of scans, etc here too.
- Click Scan and allow it to run. When it is finished, it will show up as a full size spectrum and then save as required.
- It is recommend that the files are saved as both *.sp and *.asc

X Ray Diffraction

PREPARED BY: _____

CHECKED BY: _____
(Title, signature and date)

APPROVED BY: _____

(Title, signature and date)

1.0 TITLE

Standard Operating Procedure for the operation of the Siemens D-500 X-ray diffractometer (XRD).

2.0 PURPOSE

This SOP consists of the operating procedure for the Siemens D-500 X-ray diffractometer (XRD).

3.0 SCOPE

This document is the standard procedure for the operation of the Siemens D500 XRD maintained by CREST and located in room B.04 of the FOCAS Institute. It is not designed to replace the manual. The instrument manual supplied by the manufacturers is located beside the XRD machine.

4.0 RELATED PROCEDURES

Procedure	SOP Number
Use of Personal Protective Equipment at CREST	50-001
Risk Assessment and MSDS Storage	50-002
Completion and Archival of Quality Records	09-001
Training & Competence of CREST Employees	18-001

5.0 DEFINITIONS

XRD	The Siemens D500 powder X-Ray diffractometer is located in room B.04.0 of the FOCAS building
XRD Keyholder	The designated person responsible for the control of the XRD Key will approve the use of the XRD, only competent trained persons will be authorised to use the XRD. The present XRD key holder is Dr. Suresh Pillai, Senior R&D Manager, CREST. In his absence the XRD key holder will be Dr. Hugh Hayden, Commercialisation Manager, CREST. Upon change of keyholder, the RPO will be informed and this SOP amended accordingly.
Room Keyholder	The designated FOCAS person controls access to Room B.04.0. At present keys to room B.04.0 is held by Dr. Suresh Pillai. Upon change of keyholder, the RPO will be informed and this SOP amended accordingly.
RPO/DRPO: The Radiation Protection Officer/Deputy Radiation Protection Officer.	The Radiation Protection Officer for the DIT is Dr Jacinta Browne, School of Physics (Tel: 01-40243737 and email: Jacinta.browne@dit.ie) The Deputy Radiation Protection Officer for the DIT is Dr Steve Meaney, School of Biological Sciences (Tel: 01-4024643 and email: Steve.Meaney@dit.ie).
Radiation TLD badge	A TLD badge is used to monitor the radiation dosage to a single user during usage of the XRD. The badge must be fixed to the torso of the user. Each user must wear the designated radiation badge during usage of the XRD, which must be returned to the keyholder after use.
Local Rules	The current version (at the time of use of the present SOP) of the DIT Local Rules governing the use of radiation on the campus of the Dublin Institute of Technology. The relevant sections of this document (i.e. the present SOP and the X-ray diffractometer Safety Guide) must have been read and signed by any individual using the present SOP before using the XRD
Booking meeting	Weekly meeting which takes place in the FOCAS Institute to assign

	researchers access to facilities including the XRD
Logbook	Notebook in which details of the use of the XRD are recorded
Trained User	A trained user is one who has received full training on the operation of the instrument. At present the list of trained users is: Nigel Leyland Rachel Fagan

6.0 RESPONSIBILITY

6.1 Only properly trained staff and students may use the instrument.
6.2 The user must read and understand all sections of this SOP and answer the questionnaire before using the instrument.
6.3 User should sign the logbook for each sample analysed.
6.4 Any issues must also be recorded into the log book and a member of CREST staff must be contacted about the issue.
6.5 Undergraduate students should only use the instrument with a trained supervisor present.

7.0 TRAINING REQUIREMENTS FOR THIS SOP

Personnel Training Required	**Yes**	**No**
CREST Management Staff		X
CREST/DIT Research Staff that require ongoing XRD usage	X	
CREST/DIT Research Students that require ongoing XRD usage	X	

8.0 SAFETY

8.1 The XRD-TEM room must not be used for sample preparation or storage. Any samples found there will be discarded.
8.2 If any known or potential safety risk is associated with the samples, please provide relevant RISK ASSESSMENT & MSDS in advance of the analysis taking place.
8.3 The Siemens D500 diffractometer produces ionizing radiation using high voltage sources. Care must be taken to ensure the safety both of the operator of the diffractometer and nearby researchers.
8.4 Room B.04.0 is out of bounds during usage of the XRD to all except the operator(s) of the XRD, who must be wearing his or her radiation badge, while the XRD is in use. The room must be locked from the outside when the unit is in operation and the operator is not present within the room.
8.5 Only authorized personnel wearing radiation warning badges are allowed access the room during operation of the unit.
8.6 IF DURING THE USE OF THIS SOP, ANY MALFUNCTIONS OF THE INSTRUMENT ARE OBSERVED, THESE SHOULD BE REPORTED IMMEDIATELY TO THE KEYHOLDER AND THE RPO/DRPO, AND THE UNIT TURNED OFF IMMEDIATELY.
8.7 The user should read each and every part of the DIT RADIOLOGICAL SAFETY MANUAL Appendix (ii) DIT's RADIATION SAFETY GUIDE FOR USERS OF X-RAY DIFFRACTOMETER SYSTEMS Appendix (iii).

9.0 MATERIALS/EQUIPMENT

If you wish to become a regular user, please discuss this with your supervisor, the keyholder, and the RPO and/or DRPO. Undergraduate students must not use the instrument without a trained supervisor present. Users of the instrument who suspect or are aware that they are pregnant should consult the

RPO/DRPO before commencing use of this instrument. At the agreed time, the XRD keyholder will give you the XRD key and XRD logbook and the room keyholder will give you the key for room B.04. You will be asked to sign and date the logbook by the keyholder. You will also be asked to sign out a radiation TLD (thermoluminescent dosimetry) radiation badge from the keyholder if you are a 'guest' user and have not already been assigned one by the RPO/DRPO. Prior to use of the instrument you must have read and signed the relevant sections of the Local Rules (this procedure) and the X-ray diffractometer Safety Guide, which are kept and maintained by the Keyholder on behalf of the RPO/DRPO.

10.0 PROCEDURE

Put on your TLD badge. Ensure that the window of the TLD faces outwards from the badge. Badges should be worn on the front of the torso at the waist.XRD Machine

10.1 At the beginning of every month a radiation survey will be carried out to ensure that there is no radiation leakage from the XRD unit by the designated key holder using the series 900 mini-monitor.

10.2 Fill in the XRD log book. The log book must be filled in for every sample analysed. Required input details: date, start time, finish time, sample details, any issues or comments and initials. The log book needs to be filled in to record a service or calibration event and should also include details about the chiller. The first user on Monday should (or the following day if the Monday is a holiday) check the water level in the chiller (in the chiller room outside the building) BEFORE turning the machine on. Then, the user should write "chiller level OK" or "filled chiller" in the comment section of the log book.

Open the valves for the XRD water lines (black tubing) under the sample preparation bench.

10.3 Turn on the chiller.

10.4 Make sure that the'X-ray in use' sign displayed outside the room

10.5 Lock the door to room B.04. the user should always inform the keyholder if the device is being left running without an operator

10.6 Turn on and log into computer.

10.7 *XRD Machine is in standby mode, in this setup:*

a. Current is set at 5mA

b. *Voltage is set at 20 kV*

10.8 Ensure the switch (green button, top left) is turned on (Figure 1)

10.9 Ensure that the key is on the ON position.

10.10 Click on the yellow button below the key and wait for the green button to light and then click on the green button

10.11 Slowly turn the voltage knob to 40kV, spend 5-10 minutes doing this step.

10.12 Turn the current knob to 30mA, spend 5-10 minutes doing this step.

10.13 Open sample chamber and place sample inside.

10.14 Make sure that the sample holder is tight

10.15 Click the 'open' button (make sure that the red light inside the chamber is on)

10.16 Close door to sample chamber and use software to prepare x-ray pattern run.

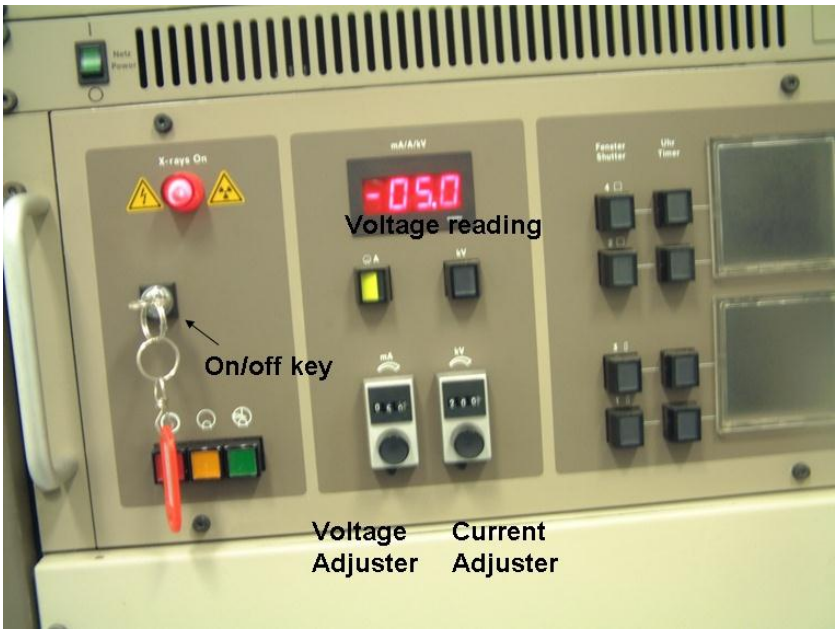


Figure 1: Image showing the current and voltage adjuster in the panel of XRD machine.

Computer Software Settings

Use the software controller on the PC to calibrate the system and record data as follows:

10.17 Open software program XRD (XRD Commander)
10.18 Select job
10.19 Fill in information as per Table 1 overleaf

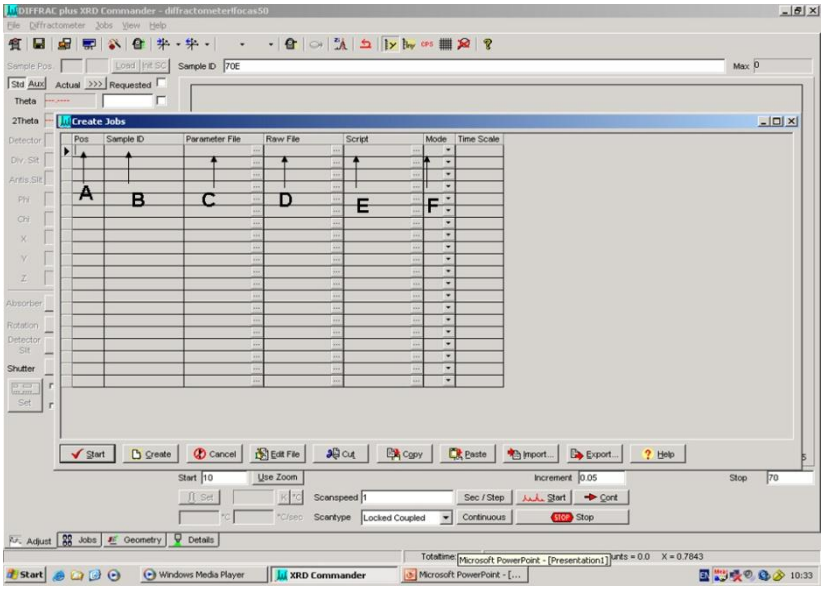


Figure 2: Screen shot of software program XRD

Table 1: Information to be filled in the software programme (XRD Commander)

A	**Pos**	**Leave blank**
B	**Sample ID**	**Your sample name**
C	**Parameter file**	**Select XRD1 (20 mins run from 20-80^0)**
D	**Raw File**	**Select directory where to save file & name file**
E	**Script**	**Select measure**
F	**Mode**	**Select QL**

10.20 When everything is filled in select the **start button**. (press okay if asked to perform calibration);

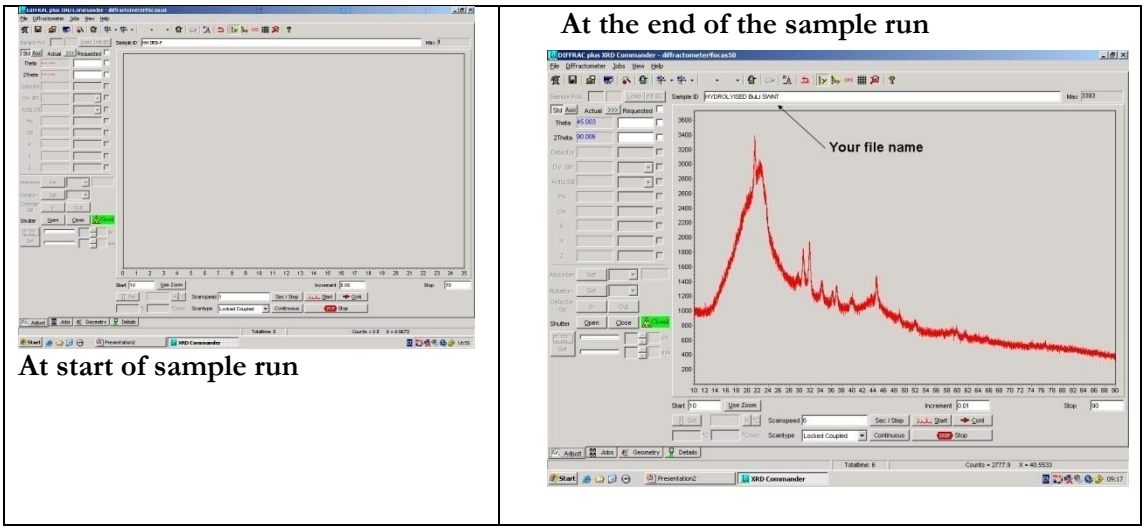


Figure 3 Screen shot of XRD commander at start and end of sample run

Changing Samples

10.22 Ensure that the sample run is finished;

10.23 Shut X-ray-window before opening door. This step is a very important safety feature, failure to do so will result in the machine shutting down, this could damage the XRD-tube (replacement cost €3000).
10.24 Open door, Push down button to release glass slide and then remove the sample slide.

Finishing Session

10.24 Shut X-ray-window before opening door
10.25 Remove sample from the XRD machine
10.26 Slowly return the current to 5mA. Takes 10 mins to do this
10.27 Slowly return the voltage knob to 20kV. Takes 10 mins to do this
10.28 Click on the 'Red' button to turn off X-ray.
10.29 Turn key to OFF position
10.30 Turn off the chiller
10.31 Check if the log-book is completed.
10.32 Ensure that all benches are tidy and no sample slides are left behind.
Make sure that the 'X-ray NOT in use' sign is displayed outside the room and unlock the door.
10.33 Return the XRD room key and the TLD badge to the card holder
10.34 Return to laboratory and wash the XRD glassware.

10.35

General Regulations

10.36 Return the TLD badge and keys immediately after the use;

10.37 Those who are violating any of the rules or regulations described in this SOP will lose their access for a week in the first offence, a month for the second offence and permanently for the third offence.

11 APPENDICES

Appendix (i) Template of questionnaire sheet for SOP (11-00xx). To be photocopied, filled out and the hard copy must be placed in training file folder in Cabinet 1 in the CREST office.

12.0 AMMENDMENT RECORD

Section	Reason for Revision	Date	Rev
NA	New Owner	27/11/2013	D

APPENDIX (i) *Template of questionnaire sheet for SOP (11-00XX). To be photocopied, filled out and the hard copy must be placed in training file folder in Cabinet 1 in the CREST office.*
Questionnaire for SOP 11-005

Q1. VERBALLY EXPLAIN TO THE TRAINER, THE PROCEDURE FOR ANALYSING SAMPLES OF ANY KNOWN OR POTENTIAL SAFETY RISK IS ASSOCIATED.

Q2. VERBALLY EXPLAIN TO THE TRAINER, THE PROCEDURES OF HANDLING THE RADIATION TLD BADGE.

Q3. VERBALLY EXPLAIN AND DEMONSTRATE TO THE TRAINER, THE SEQUENCE OF THE STEPS INVOLVED FROM TURNING ON THE CHILLER TO TURNING ON THE MACHINE.

Q4. VERBALLY EXPLAIN AND DEMONSTRATE TO THE TRAINER, THE OPERATION OF THE XRD SOFTWARE (XRD COMMANDER).

Q5. VERBALLY EXPLAIN AND DEMONSTRATE TO THE TRAINER, THE SEQUENCE OF THE STEPS INVOLVED IN CHANGING THE SAMPLE.

Q6. VERBALLY EXPLAIN TO THE TRAINER, HOW TO ADDRESS ANY MALFUNCTIONS OF THE INSTRUMENT ARE OBSERVED.

Q7. VERBALLY EXPLAIN AND DEMONSTRATE TO THE TRAINER, THE SEQUENCE OF THE STEPS INVOLVED IN TURNING OFF THE XRD MACHINE.

I, the undersigned, confirm that I have read and understood this SOP and agree to carry out related actions according to the instructions in this SOP.

NAME: _____

SIGNATURE: _____

DATE: _____

RAMAN

NOTE: All measurements must be taken three times unless otherwise stated and must utilise the objective for use in the measurements for which the calibration is performed (unless indicated). The steps should be followed in sequence.

1. Zero Order Measurement:

(i) Move the grating using the **<** option (to the left of the number indicating grating position) until 'Zero' is indicated in the corresponding window in Labspec. This moves to the zero order of the grating.
(ii) With a short acquisition time, acquire a spectrum of the zero-order peak. If the signal is saturated, reduce by reducing the hole size.
(iii) Fit this peak using a Gaussian/Lorentz function using the 'Approx' and 'Fit' options within the 'Peaks and Bands' within Labspec. Use the 'Bands' option to find the exact position of this peak.
(iv) Adjust the 'Zero' option within 'Calibration' and repeat (i) through (iv) until the peak position is satisfactory.

2. Si peak at 520.7 cm^{-1} verification (x100 objective):

(i) Move the grating such that 520cm^{-1} is within the window displayed and the 0cm^{-1} laser peak is outside the window (the central position varies from laser to laser and grating to grating).
(ii) Acquire a spectrum from a Silicon sample such that the peak is not saturated and is well formed (adjustment of the acquisition time or hole size may be necessary to achieve this).
(iii) Fit this peak using a Gaussian/Lorentz function using the 'Approx' and 'Fit' options within the 'Peaks and Bands' within Labspec. Use the 'Bands' option to find the exact position of this peak in wavelength. The peak should be centred on 520.7 cm^{-1}
(iv) If the peak is off, adjust the "co-eff" option with 'Calibration' so that it corresponds to 520.7 cm^{-1} (remember depending on wavelength/grating, there is only 1-2cm^{-1} precision).
(v) Verify the position of this peak and repeat (i)-(iv) until satisfactory (should be within 1 wavenumber of 520.7 cm^{-1}).

3. Dark current acquisition:

(i) Ensure the filter is at 100% if it has been adjusted and that the hole is at the appropriate setting. With the objective unfocussed on any sample, the laser and ambient light switched off, acquire a spectrum over the spectral range and for the acquisition time that is to be used during the measurements.
(ii) Perform this acquisition three times and save each spectrum separately

4. Spectrum of optics of system

(i) With the laser switched on and the objective unfocussed, acquire a spectrum over the spectral range and for the acquisition time that is to be used during the measurements.
(ii) Perform this acquisition three times and save each spectrum separately.

5. PET spectrum:

(i) Focus the laser objective on a sample of PET.
(ii) Acquire a spectrum of PET such that the detector is not saturated and the peaks are well formed.
(iii) Perform this acquisition three times and save each spectrum separately.
(iv) For the acquisition time used to acquire the spectrum, also acquire a dark current acquisition as per step 3 above.

6. Fluorescent standard (785nm or 514.5nm) spectrum (x100 in-air objective):

(i) Acquire multiple spectra, ideally on different spots, of the fluorescent standard for the acquisition time and spectral range to be used in the experiment (3x3 second acquisition is useful).
(ii) Perform this acquisition three times and save each spectrum separately.

7. Substrate spectrum:

(i) Acquire a spectrum of the substrate on which the sample is mounted for the acquisition time and spectral range to be used in the experiment.
(ii) Perform this acquisition three times and save each spectrum separately.

SAVING OF SPECTRA:

If spectral measurements are to be imported into Matlab, all spectra (including those acquired at calibration) must be saved in .ms0 or .tsf (or preferably both) formats for single point measurements, and in .tvf formats for spectral images.

SYSTEM REBOOT PROCEDURE:

If the software becomes non-responsive, it may be necessary to reboot the system. If the lack of response comes from motors (grating, hole, slit etc.), a common reboot for all three systems entails.

(i) Close software;
(ii) Turn off Instrument Power Module (large box underneath monitor);
(iii) Restart Computer;
(iv) Turn on Instrument Power Module (large box underneath monitor);
(v) Reboot software;

If the software gives a detector error on start-up, a more extensive shut down may be required (perform the following steps in sequence for the Raman instrument in question).

(i) Close software;
(ii) Turn off:
(a) Old Raman:
Instrument Power Module
"Flat White unit" behind Instrument Power Module

(b) New Raman:
Instrument Power Module
"Flat White unit" on top of Instrument Power Module
Tango (black) Unit

(c) Dual Raman:
Instrument Power Module
Tango (black) Unit behind monitor

"Flat White unit" Rear left of Instrument
Tango (black) Unit beside 785/830 power supplies

(iii) Restart Computer;
(iv) Turn on Instrument Power Module (large box underneath monitor);
(v) Reboot software;

Fumehoods

Focas Research Institute
Standard Operating Procedure (SOP): Safe Use of High Temperature Box Furnaces
Author: Theresa Hedderman
Revised: N/A

Occupational Health Officer: Yvonne Mc Ardle
Emergency Medical Services: 112, 999
Campus Student Health Centre Aungier Street: 402 3051
Poison Control: 01 8092566, 01 8379964

Function and Usage
A Fume Hood is essentially a ventilated box with one side providing an adjustable opening. It provides air extraction to remove any fumes produced within the box. It is designed to have laminar flow (even and non-turbulent air-flow) through the front opening. To obtain even flow through the face of the fume cupboards, baffles are generally installed at the back of the cupboard. These baffles are set to extract the air from two or more locations across the back of the fume cupboard. Fume cupboards draw air out of the rooms they are installed in. There needs to be an adequate volume of air available or the fume cupboard will not be able to draw a sufficient volume of air to function properly. Where the room is small or there are a large number of fume cupboards an additional supply of air, other than the normal room ventilation, may be required. This additional air is known as the make-up air. If the make-up air supply is not adequate or the make-up air is switched off then the fume cupboards may not be able to achieve the required face velocity. Alternatively if there is no make-up air and the room ventilation is switched off, there may be insufficient air volumes for the fume cupboards to achieve the required face velocity. This can cause fumes to escape in to the laboratory. The base of the fume cupboard area must be kept clear to allow effective ventilation of the work area.

Maintenance
Regularly maintain the fume cupboard by:

- Removing the contents of the cupboard and washing the walls and work bench.
- Keeping sinks and drains clear of refuse and checking them regularly.
- Labelling all containers in the fume hood appropriately.
- Ensuring waste bottles in the fume hood are capped when not in use and are disposed of regularly.

Maintenance of fans must be carried out regularly (annually recommended).

Safe Work Procedure

- Perform all work that involves hazardous and noxious materials in the hood. If a fume hood is not set up and used appropriately, fumes may escape out of the sash opening of the hood towards the user, especially with heavier vapours such as formaldehyde or chlorinated solvents.
- Do not work within 10cm of the leading edge. The larger the item, the further back it needs to be within the fume cupboard to overcome the turbulence created.

- Work extending arms under or around the sash, placing the head behind the sash, with the glass between the worker and the chemical source. The sash will act as a primary barrier in the event of spill, splash or explosion. Heads must always be kept out of fume hood while working.
- Put the minimum amount of materials in the hood required for the current operation. Each additional item in the hood creates additional turbulence and potential for gas/vapour escape. Do not place storage items behind the area you are working in.
- Do not put large equipment in the fume cupboard, as they block the baffles and produce regions of zero or low flow in the work space.
- Do not open windows which may create draughts in the vicinity of the fume cupboard. The make-up air supply and room ventilation should be on whenever the fume cupboard is in use.
- Do not use perchloric acid in a standard hood. Use a water-washed hood.
- Do not use infectious materials in a chemical fume hood.

Before using a fume cupboard for the first time:

- Check that the flow reading on the test certificate meets or exceeds the flow rate requirement.
- Locate where the fan failure warning alarm is and what it will sound like (if fitted).
- Locate the fire damper or emergency stop (if fitted) for use in the event of a fire.
- Locate the nearest phone, fire extinguisher/blanket, shower or eyewash station and know who and where the qualified first aid providers are.
- Wear protective clothing (laboratory coats and gloves).

Hazards associated with the use of a fume hood

- While fume hoods are designed to protect the user from hazards, misuse can cause them to afford less protection than expected and, hence, becoming a hazard in their own right.
- The effectiveness of a fume hood is reduced if the sash is open too wide or the hood is cluttered with apparatus.
- Fume hood fans are susceptible to failure leaving them effectively useless.
- The front sash may be made of heavy glass. Accidents have occurred when the sashcord breaks.

Risk associated with the use of a fumehood

Fume hood sash left open and blockage of airflow which allows the escape of the fumes from toxic and noxious material. The probability of injury is slight to moderate and may increase with the toxicity of the escaping material.

From the apparatus itself, *i.e.* fan not functioning or broken sash. The probability is slight but damage could range from moderate to severe.

Applicable Standards and Regulations

British Standards Institution: BS EN 14175:2003 Fume cupboards

British Standards Institution: BS EN 7258:1994 Laboratory fume cupboards

High Temperature Box Furnace

Focas Research Institute
Standard Operating Procedure (SOP): Safe Use of High Temperature Box Furnaces
Author: Theresa Hedderman
Revised: N/A

Occupational Health Officer: Yvonne Mc Ardle
Emergency Medical Services: 112, 999
Campus Student Health Centre Aungier Street: 402 3051
Poison Control: 01 8092566, 01 8379964

Introduction

General: This type of apparatus uses high temperatures during operation. High temperature furnaces use high voltage to generate temperatures above 500°C. Do not open the furnace or remove any substrates until the oven and its contents have cooled sufficiently for safe handling. Be aware that materials may not glow or appear hot under 600 °C.

Heating Elements: The furnaces operate to a maximum temperature of 1100-1600 °C. Ramp up and ramp down rates are relative (1 hour to many hours depending on synthesis procedures). It should be noted that prolonged heating at temperatures below 1000 °C can cause damage to the $MoSi_2$ heating elements. This is because MoSi2 oxidizes to SiO_2 and weakens the elements at temperatures in the range of 400-800 °C.

Melting Points: It is helpful to know the approximate melting temperature of your material. If you are unsure, a sample container should be used which can contain your sample in a melted form. This is necessary because it helps to protect the furnace insulation from contamination and damage. The insulation is very expensive to replace.

Quenching: Quenching of samples from high temperatures can be extremely dangerous! This procedure should never be performed alone and should be done so using additional protective equipment including high temperature gloves, long handled tongs, full face shields and flame proof jackets. This procedure should be minimized, however, as it also can damage the insulation and heating elements. In the event of a fire, the standard fire protocol should be followed.

Sealed Tubes: When it is necessary to heat sealed tubes, the quality and melting point of the tube should be checked. Sealed tubes heated in the furnace can explode and cause serious damage to furnace and/or cause serious injury to the user if the explosion occurs during sample removal. Additional protective equipment is required including a full face shield, gloves, lab jacket and tongs.

This SOP should be read and understood prior to the commencement of relevant work and used to complement supervised practical familiarization with the various techniques described. MSDS for any materials to be heated must also be consulted before starting work. MSDS are easily found from supplier websites, or contact the technical office on the second floor of the Focas Research Institute for advice.

Hazard

Hazards: High voltage is needed to generate temperatures greater than 500 °C. With the high voltage come inherent dangers of electrocution, fire, and severe burns. Make sure the furnace is properly grounded and no loose wires are connected to the furnace and wear all necessary protective clothing while operating. The furnace program should be stopped, or the furnace shut off before opening the furnace door. Working with high temperatures between 200 – 1600 °C; materials will not always glow or appear hot, but will cause severe tissue damage with improper handling.

Personal protective equipment (PPE): Before using the furnace, ensure that at least the following protective equipment is available to you:-

1. Safety glasses
2. Thermal gloves
3. Closed-toe shoes with socks
4. Long pants (no shorts!)
5. Lab coat
6. Face shield
7. Safety mask (when necessary)

Engineering controls: There are no ventilation controls for the furnaces. Most box furnaces have muffles which allow gasses to escape. **All furnaces should therefore be placed in fume hoods,** and each fume hood should be checked for proper flow. Consult your technical team, or your supervisor if there is no fume hood or you are unsure about the proper use for the fume hood. If you are treating a material which could pose a health risk special precautions must be adhered to.

Emergency response in the case of spill or other accident: If you drop your sample on the work bench and it catches fire, or if you accidentally drop the sample on yourself **don't panic!** Remain calm and contact technical staff; if the fire is out of control engage the fire alarm for the building.

Procedures for safe operation of box furnace

- *Before commencing work:* Any person using the high temperature furnaces must be trained by their supervisor prior to using the equipment. Under ordinary circumstances it is advised that the buddy system is in operation while working with the high temperature furnaces. If you have to work with a high temperature furnace and you are alone, you must ask for approval from your supervisor.

- *Preventing contamination:* If there are any spills, make sure the area is cool, then clean up with paper towel or a mop. You must adhere to current disposal laws and protocols. Upon leaving a designated work area, remove any personal protective equipment worn and wash hands. After each use (or day), wipe down the immediate work area. At the end of each project, thoroughly decontaminate the designated area before resuming normal laboratory work in the area.

- *Precise process description: See the link below for* step-by-step instructions for furnace operation.

Carbolite furnace: http://www.carbolite.com/DocGallery2.asp?catid=1

Nabotherm furnace: http://www.coleparmer.com/Assets/manual_pdfs/33334-xx.pdf

Oven/Vacuum Oven

Focas Research Institute
Standard Operating Procedure (SOP): Safe Use of High Temperature Box Furnaces
Author: Theresa Hedderman
Revised: N/A

Occupational Health Officer: Yvonne Mc Ardle
Emergency Medical Services: 112, 999
Campus Student Health Centre Aungier Street: 402 3051
Poison Control: 01 8092566, 01 8379964

Hazards

Electrically heated ovens are commonly used in the laboratory to remove water or other solvents from chemical samples and to dry laboratory glassware. *Never use laboratory ovens for human food preparation*.

- Laboratory ovens should be constructed such that their heating elements and their temperature controls are physically separated from their interior atmospheres.
- Laboratory ovens must only be used in a fumehood.
- Ovens should not be used to dry any chemical sample that might pose a hazard because of acute or chronic toxicity unless special precautions have been taken to ensure continuous venting of the atmosphere inside the oven.
- To avoid explosion, glassware that has been rinsed with an organic solvent should be rinsed again with distilled water before being dried in an oven.
- Bimetallic strip thermometers are preferred for monitoring oven temperatures. Mercury thermometers should not be mounted through holes in the top of ovens so that the bulb hangs into the oven. Should a mercury thermometer be broken in an oven of any type, the oven should be closed and turned off immediately, and it should remain closed until cool. All mercury should be removed from the cold oven with the use of appropriate cleaning equipment and procedures in order to avoid mercury exposure.

Procedure

- Switch on the mains and the instrument and adjust the required temperature by using thermostat.
- Keep the sample in the space provided.
- Close the door of the apparatus and tighten the lock to achieve the vacuum.
- Switch on the vacuum pump and apply the required vacuum by controlling through the valve and measure the required vacuum on the calibrated vacuum gauge provided in the apparatus.
- Close the valve and switch off the vacuum pump.
- Check the required temperature is reached thermometer provided inside of the oven.
- After the required time has elapsed for the material, release the vacuum through the valve. Switch off the instrument and open the door for removing samples.
  Close door after removing samples.

Vacuum Oven

Focas Research Institute
Standard Operating Procedure (SOP): Safe Use of High Temperature Box Furnaces
Author: Theresa Hedderman
Revised: N/A

Occupational Health Officer: Yvonne Mc Ardle
Emergency Medical Services: 112, 999
Campus Student Health Centre Aungier Street: 402 3051
Poison Control: 01 8092566, 01 8379964

PROCEDURE:

- Switch on the mains and the instrument and adjust the required temperature by using thermostat.
- Keep the sample in the space provided.
- Close the door of the apparatus and tighten the lock to achieve the vacuum.
- Switch on the vacuum pump and apply the required vacuum by controlling through the valve and measure the required vacuum on the calibrated vacuum gauge provided in the apparatus.
- Close the valve and switch off the vacuum pump.
- Check the required temperature has reached thermometer provided inside of the oven.
- After the required time has elapsed for the material, release the vacuum through the valve. Switch off the instrument and open the door for removing samples.
  Close door after removing samples.

Hazards

Electrically heated ovens are commonly used in the laboratory to remove water or other solvents from chemical samples and to dry laboratory glassware. *Never use laboratory ovens for human food preparation*.

- Laboratory ovens should be constructed such that their heating elements and their temperature controls are physically separated from their interior atmospheres.
- Laboratory ovens rarely have a provision for preventing the discharge of the substances volatilized in them. Connecting the oven vent directly to an exhaust system can reduce the possibility of substances escaping into the lab or an explosive concentration developing within the oven.
- Ovens should not be used to dry any chemical sample that might pose a hazard because of acute or chronic toxicity unless special precautions have been taken to ensure continuous venting of the atmosphere inside the oven.
- To avoid explosion, glassware that has been rinsed with an organic solvent should be rinsed again with distilled water before being dried in an oven.
- Bimetallic strip thermometers are preferred for monitoring oven temperatures. Mercury thermometers should not be mounted through holes in the top of ovens so that the bulb hangs into the oven. Should a mercury thermometer be broken in an oven of any type, the oven should be closed and turned off immediately, and it should remain closed until cool. All mercury should be removed from the cold oven with the use of appropriate cleaning equipment and procedures in order to avoid mercury exposure.

Sonic Tip

Focas Research Institute
Standard Operating Procedure (SOP): Safe Use of Sonic Tip
Author: Theresa Hedderman
Revised: N/A

Occupational Health Officer: Yvonne Mc Ardle
Emergency Medical Services: 112, 999
Campus Student Health Centre Aungier Street: 402 3051
Poison Control: 01 8092566, 01 8379964

PROCEDURE:

- Switch on the mains and then the instrument.
- When using the tip the maximum power it can be set to is 40%
- Adjust the wheel beside the power button to change the power.
- Clean the tip prior to use with warm soapy water.
- Place the sample in the safety box and under the tip.
- Adjust the jack so that it is three quarters way down into the solution.
- Close the door of the safety box and then press start.
- When the allotted time has passed press the stop button, open the door of the safety cabinet, lower the jack and remove the sample.
- Clean the tip

Hazards
The sonic power has the potential to generate heat within the sample. This issue requires consideration when solvents are placed under the tip. Please consult the MSDS for the flash point of the solvent before placing it under the tip. It is the responsibility of the user to check the MSDS for the particular solvent. If the user is unsure they are required to consult with the laboratory co-ordinator.

Liquid Nitrogen

Focas Research Institute
Standard Operating Procedure (SOP): Safe Use of High Temperature Box Furnaces
Author: Theresa Hedderman
Revised: N/A
Occupational Health Officer: Yvonne Mc Ardle
Emergency Medical Services: 112, 999
Campus Student Health Centre Aungier Street: 402 3051
Poison Control: 01 8092566, 01 8379964

Introduction
Liquid nitrogen is held in a cooled state. As it begins to warm (above around -195^{o}C) it starts to change from a liquid into a gas. One litre of liquid nitrogen if allowed to warm will rapidly generate 682 litres of nitrogen gas. Nitrogen gas is a colourless non-toxic odourless gas.

Hazards

One litre of liquid nitrogen if allowed to warm will rapidly generate 682 litres of nitrogen gas. Nitrogen gas is a colourless non toxic odourless gas and is termed a simple asphyxiant. This means that if present in a high enough concentration the nitrogen gas can suffocate a person by as a result of oxygen deprivation. Such a risk requires serious consideration where liquid nitrogen is being stored and used. Ideally the location for storage and use of the substance should be well vented. As mentioned liquid nitrogen about will expands as it warms generating nitrogen gas. This can cause the build up of extreme pressure if the substance is stored in an inappropriate container. This can give rise to the container exploding. Liquid nitrogen should only be stored in an approved container.

The hazards involved with handling liquid nitrogen are frostbite and cold burns. Liquid nitrogen can cause damage to living tissue as a result of prolonged contact. A brief encounter with the substance may not cause skin damage but prolonged contact certainly will. Cold burns and frostbite as a result of exposure to the substance can lead to permanent disfigurement which could include amputation of digits. Additionally liquid nitrogen burns can occur when it is spilled onto clothing without the person being aware or if porous gloves are worn and become contaminated. Also if liquid nitrogen is inhaled then it can cause damage to the lungs and respiratory tract. Again if splashed into the eyes irreparable eye damage is a serious risk.

Personal protective equipment (PPE): Before using liquid nitrogen ensure that at least the following protective equipment is available to you:-

1. Safety glasses
2. Thermal gloves BS EN 511 (Cold Protection)
3. Closed-toe shoes with socks
4. Long pants (no shorts!) The wearing of clothing that leaves the legs uncovered should be avoided
5. Lab coat
6. Face shield
7. Safety mask (when necessary)

Users should always ensure that they keep liquid nitrogen off their bodies / clothing and out of their lungs and eyes.

The most significant risk from liquid nitrogen is death by asphyxiation where a spill or leakage depletes the atmospheric oxygen locally. If the oxygen concentration falls below 18% adverse effects will occur resulting in loss of mental alertness and performance combined with distortion of judgement. In atmospheres containing less than 10% oxygen death by asphyxiation is rapid: just two breaths of oxygen-free air kills. All users of liquid nitrogen should be aware of the symptoms of anoxia (physiological oxygen depletion). These include dizziness, a narcotic type affect; nausea, confusion, etc. Persons experiencing such symptoms should remove themselves to fresh air. Persons observing such symptoms in co-workers should remove them to fresh air. In the event that breathing stops inform the local first aider and give artificial respiration. Do not attempt to rescue anyone from a confined space if they were working with liquid nitrogen and they have lost consciousness - open the door if possible and raise the alarm on internal telephone number 999/112.

When storing and using liquid nitrogen there are a number of rules must be followed to minimise the risk of asphyxiation:

- Only those vessels composed of suitable material may be used for storing liquid nitrogen. Some materials e.g. glass and some plastics, may fracture at low temperatures releasing nitrogen gas.
- Liquid nitrogen should not be transported through heavily populated areas of buildings in case of spillages. Stairs should be avoided unless the volumes being transported are small. Persons involved in the transport of liquid nitrogen should wear appropriate personal protective equipment.

When using lifts to transport liquid nitrogen the following should be adhered to:

- Dewars must not be accompanied in lift. A lift is a confined space and should leakages occur asphyxiation is possible.

- One person should place the Dewar in the lift whilst another waits to receive the Dewar from the lift once the journey is complete
- Lone working with liquid nitrogen should be avoided wherever possible. If required a Lone Working Risk assessment should be carried out.

Bulk storage (>25 litres) areas for liquid nitrogen must:

- Display hazard warning signage
- Be restricted to authorised personnel only
- Be continuously ventilated if possible
- Have more than one escape route if possible
- Avoid the use of wide-necked, shallow vessels to prevent excessive evaporation and the possibility of oxygen depletion.
- When disposing of liquid nitrogen do not pour it down the sink or allow it to vaporise into enclosed areas such as laboratories, fridges, freezers, cold rooms, etc. Liquid nitrogen to be disposed of through vaporisation must be left in well ventilated area e.g. a fume hood.
  .

Procedures for safe use of liquid nitrogen

- Only trained personnel to handle liquid nitrogen.
- A Material Safety Data Sheet for liquid nitrogen must be readily available.
- All metallic jewellery should be removed when handling liquid nitrogen as metal items will quickly spread the cold from any contact with the cryogenic material.
- When pouring liquid nitrogen do so slowly and carefully to minimise splashing and rapid cooling of the receiving container.
- Always use thongs when placing or removing items from liquid nitrogen.
- Never overfill Dewars.
- Use dip sticks to check liquid depth in Dewars. Do not use fingers.
- Pregnant females and asthmatic workers must seek medical approval prior to working with liquid nitrogen.
- Low temperature damage to the insulation on electrical cables can lead to electrocution and equipment damage. Liquid nitrogen users must ensure that cables are not placed where they can be affected by spillages.
- Carry out a risk assessment for the use of liquid nitrogen
- Only use purpose built trolleys and cantilevered units for the movement and decanting lf large cylinders. Avoid the manhandling of large cylinders for decanting.

In the event of a cold burn from liquid nitrogen:

- Remove any restrictive clothing - but not any that is frozen to the tissue
- Flush the affected area with tepid water (not above 40^{o}C) to return tissue to normal body temperature
- Do not apply any direct heat or rub affected area
- Cover with a loose, sterile dressing and keep patient warm
- Obtain medical assistance immediately

Appendix 3

FOCAS Research Institute Regular and Out of Hours Access

Access Procedures: FOCAS Research Institute

Occupants
All Occupants of the FOCAS Research Institute will be issued with a personal electronic access card and code.
Academic supervisors of postgraduates resident in the building will be counted as occupants.
Project students spending more than 2 days a week for a period of more than 6 weeks are considered occupants.

All Occupants should be registered by filling out the attached form and confirmed by approval from the Head of the FOCAS Research Institute.

All "Occupant" access will be issued initially for a period of 3 months, during which time the occupant must undertake all required training/project Risk Assessment

Training:	Emergency First Aid	*
	Emergency Response	*
	Manual Handling	**
	Health and Safety Legal update	
	Radiological Protection	

* Mandatory
** Online course mandatory for all

Visitors
Each Research Unit will be issued with 5 additional electronic access cards.
The cards will clearly indicate "Visitor" and display the logo of the research unit.
Access period and/or duration can be preprogrammed
Issue, Tracking and Retrieval of the access cards is the responsibility of the research unit.

A €10 cost will be charged for additional or replacement cards.

Contractors
Electronic access cards for contractors and other visitors will be issued by the Buildings Maintenance Office, DIT Kevin Street.
The cards will clearly indicate "Contractor".

Access Card Request Form

For FOCAS access please complete the following (Please Use Block Capitals)					
First Name/ Last Name					
Mobile Number					
E-Mail					
Staff/Student/Visitor					
Out of Hours Access Category					
Roof Access Required (Y/N)					
Access Duration (From/To)					
Training Completed					
Emergency 1st Aid		**Emergency Response**		**Manual Handling**	

The following declaration must be signed before card may be activated.

This permit allows you to access the FOCAS Research Institute
I acknowledge that the information is correct and I accept that my card & pin number is for my own personal use and will not be used by or given to others.

Should your card be lost it must be reported to the Buildings Office or FOCAS Management/Administration who will disable it immediately. A replacement card can be obtained from the students services office in DIT Aungier Street and a small cost may be incurred for a replacement.

Signed		Date
Approved	Supervisor	Date
	Facility Manager	Date

For official Use	Mifare Number		Fob number	

Out of Hours Access Procedure

Foreword

This document is designed to inform all staff and post graduates at Dublin Institute of Technology of the procedures required for out of hours working, with specific reference to the FOCAS Research Institute, DIT Camden Row.

Dublin Institute of Technology strongly recommends that in the interest of health, safety and security, out of hours work should only be undertaken when absolutely necessary and no alternatives are available.

Unsupervised work by undergraduate students is strictly prohibited at all times.

Definitions

"Out of working hours working" may be defined as: any other work undertaken outside 8am - 10pm Monday to Friday and on Saturday, Sunday & Bank and other holidays.

Risk Categories

The following risk categories apply to out of hours working:

Category A **Risk (unacceptable)**	Activities to be carried out 9am – 6pm Mon – Fri only under direct supervision
Category B **Risk (High)**	Activities to be carried out only by authorised researchers with a competent "buddy"* in attendance.
Category C **Risk (Medium)**	Activities to be carried out by sufficiently competent researchers (may or may not require a "buddy")
Category D **Risk (Low)**	Activities to be carried out by any postgraduate/staff member (e.g. office work)

*Buddy means a second competent person is present. Buddies should be identified by supervisors, Head of Research Group/Centre and/or Head of FOCAS as part of the risk assessment exercise.

Researchers should be approved to undertake the types of activity which fall into the respective categories.

Steps to be taken

1. The Head of FOCAS, in consultation with FOCAS Health and Safety Committee is responsible for drawing up a master list of typical research activities/activities and completing a risk assessment for each activity and categorising the risk associated with those activities in accordance with the definitions contained above.

2. Based on an assessment of their experience and knowledge, each researcher* will be defined as competent for a range of activities within the risk categories established above.

3. This assessment will be completed by the researcher's (academic) supervisor. This assessment should be reviewed/upgraded periodically.

4. The Occupational Health Officer will review the risk assessment and take into account the structural and other controls required for such access. They may recommend certain structural controls and once this has been implemented, the out of hours access will be authorised.

5. All researchers will be considered competent to engage in **Category D** activities.

6. Researchers must be authorised by the Head of FOCAS /Head of Function to engage in **Category B & C** activities out of hours.

7. To gain out of hours access for Category B or C activities, the researcher must apply in writing to their supervisor, copied to the Head of FOCAS, specifying and, in doing so guaranteeing the presence of, the accompanying buddy.

8. All persons requiring "out of hours" access must have completed an annual "safety/security" induction prior to gaining access.

9. The Health and Safety Officer, and the Head of FOCAS will retain a listing of all those who have attended the safety/security induction.

10. All persons working out of hours must work only in the area as specified in the risk assessment and carry out only authorised activities.

11. Where the fire alarm is activated in the building out of hours, those evacuating the building must assemble at the building fire assembly point, otherwise emergency services will assume that they are still in the building. All persons should act as sweepers and evacuate the building in accordance with the training received at the safety/security induction.

12. In any other emergency occurs e.g. spill/flood, first-aid, medical assistance, suspect intruder, response should be in accordance with the training given at induction and the security company should be notified immediately.

13. In order to secure the safety and security of persons working in buildings "out of hours", access to each building is strictly limited to those authorised.

14. Authorised persons must not admit any other unauthorised person to the building out of hours.

15. Out of hours authorisation may be withdrawn if breaches in the above procedure occur or persons are found to be under the influence of alcohol/banned substances.

* Researcher includes Postgraduate Students, Technician, Academic Staff members, Visitors.

Appendix 4

FOCAS Research Institute Fire Safety Protocols

Emergency Evacuation

Role of personnel in the event of an emergency

It is essential that all personnel be fully aware of the evacuation procedures for the area in which they work.

2. **On suspecting a fire i.e. smelling or seeing smoke**
    a. Do not investigate alone
    b. Alert FOCAS Head, administration or technical staff, laboratory co-ordinators

3. **On discovering a fire:**
    a. Activate the nearest alarm call point or break glass unit (in stair well), after which
    b. Contact the FOCAS Head, administration or technical staff, laboratory co-ordinators desk or emergency services
    c. Fight the fire with the appropriate fire extinguisher
    d. Only attempt to extinguish a fire if it is safe to do so and if:
        i. The fire is small (i.e. not greater than the size of an average waste paper basket)
        ii. There is an exit to your back
        iii. You have the correct extinguisher and know how to use it

4. **On hearing an alarm activation or other warning:**

- Evacuate the building* immediately by the nearest available exit "sweep searching" areas as you go
- Shut down equipment (gas/electricity) if safe to do so and time permits
- Close windows and doors to confine smoke/fire if safe to do so and time permits
- Instruct personnel to leave the FOCAS Research Institute
- All visitors should be escorted to safety by the person they are visiting
- Anyone in common areas or moving between areas, should immediately join the lines of people exiting
- If required, assist any individuals to evacuate the area
- Form a single file on both sides of the corridor or stairway, leaving the centre passageway clear
- Do not delay or stop to collect personal belongings
- Do not use the lift
- If heavy smoke present, try to find another exit or crouch low to the floor
- All doors should be closed (not locked) by the last person in the line
- Report to your Assembly Points: **Camden Row**
- All evacuation marshals/sweepers, building maintenance personnel, FOCAS Research Institute Management, first-aiders should assemble at the assembly points to check in, reporting to the Incident Controller details of any casualties or people needing assistance with evacuation. This information is then given by the Incident Controller to the Emergency Services
- Confirm to the Incident Controller that the area has been cleared and report details of any casualties or people needing assistance with evacuation to the Incident Controller
- Do not return to the building until instructed to do so by the Incident Controller

* Separate personal emergency egress plans (PEEP) will be prepared for people with disabilities
* All visitors should be escorted to safety by the person they are visiting

Procedure for Organised Evacuation Drills

ORGANISED DRILLS

1.0 POLICY

An evacuation drill is to be held each semester, one day-time and one evening drill (where relevant). Evacuation drills are announced to relevant staff members.

2.0 PROCEDURE

RESPONSIBILITIES

FOCAS Research Institute Health & Safety Team:

- Agree schedule of dates for evacuation drills for each semester
- Agree list of key personnel to receive advance notification of drills
- Keep a record of all evacuation drills
- Plan a debrief of evacuation drills at the subsequent Health and Safety Team meeting
- Record and manage action items arising from evacuation drills

Occupational Health Officer (OHO):

- Draft communication re: schedule of drills and send to the Head of FOCAS Research Institute as the chair of the FOCAS Research Institute Health & Safety Team
- On receipt of online evacuation evaluation forms from personnel, compile all feedback and forward a synopsis to the FOCAS Research Institute Health & Safety Team

Head, FOCAS Research Institute /FOCAS Health & Safety Team:

- On receipt of drill communication from OHO, circulate it to agreed list of key personnel (Appendix)
- Following drills, circulate the online evacuation evaluation form to all personnel for completion using the internal communication system, e-mail

Buildings Maintenance Manager/ Buildings Services Supervisor

- Notify Gardaí and/or fire alarm monitoring company in advance, where necessary
- **External:** Be identifiable as the Incident Controller (orange high-visibility vest) and deal with crowd control, vehicle/pedestrian hazards and meeting with the Emergency Services on arrival.
- **Internal:** Operate and monitor the fire alarm system
- Make use of communication equipment available to give instructions where necessary e.g. walkie-talkies, loud hailers, public address system TBC
- Give the "all-clear" to return to the building
- Complete the evacuation report form (below) and keep in the fire register. Send a copy to the Health & Safety Office

Procedure for real events: Incident controller

Incident Controller

- **External:** Be identifiable as the Incident Controller (orange high-visibility vest) and deal with crowd control, vehicle/pedestrian hazards and meeting with the Emergency Services on arrival
- Once sufficient information has been obtained from the alarm panel/internally the incident controller should leave the building immediately
- Make use of communication equipment available to give instructions where necessary e.g. walkie-talkies, loud hailers, public address system
- Give the "all-clear" to return to the building

Complete the evacuation report form (below) and keep in the fire register. Send a copy to the Health & Safety Office

Training

- Briefings on evacuation procedures will be given to Centre/Group Managers and any other person the Chair of the FOCAS Research Institute Health & Safety Team requests to attend the health and safety meetings
- Centre/Group Managers will then be asked to communicate the information to their associated personnel
- Hi-vis vests are available to Centre/Group Managers in addition to a one-page information document

Health and safety team

To be sent by the Secretariat to FOCAS Health & Safety Team:

Centre/Group	Position	Name	Email
FOCAS	Administration	Damian Bruce	Damian.Bruce@dit.ie
FOCAS	Technical Support	Andrew Hartnett	Andrew.Hartnett@dit.ie
FOCAS	Technical Support	Theresa Hedderman	Theresa.Hedderman@dit.ie
FOCAS	Technical Support	Luke O'Neill	Luke.ONeill@dit.ie
FOCAS	Technical Support	Anne Shanahan	Anne.Shanahan@dit.ie
FOCAS	Head of FOCAS	Hugh J. Byrne	Hugh.byrne@dit.ie
IEO	Centre Manager	Suzanne Martin	Suzanne.martin@dit.ie
CREST	Centre Manager	Swarna Jaiswal	Swarna.jaiswal@dit.ie
MSA	Centre Manager	Grainne Hargaden	Grainne.hardagen@dit.ie
RESC	Centre Manager	Damien Trainer	Damien.trainer@dit.ie
Nanolab	Centre Manager	Alan Casey	Alan.casey@dit.ie
DEL	Centre Manager	Kevin O'Farrell	Kevin.ofarrell@dit.ie
Bio-spectroscopy	Centre Manager	Frank Bonnier	Frank.bonnier@dit.ie
CNRI	Centre Manager	Mark Davis	Mark.davis@dit.ie

Dear Colleague,

Evacuation drills are organised for **DAY DATE MONTH at TIME** (daytime) and on **DAY DATE MONTH at TIME** (evening time).

Communication: before an evacuation drill

Dear FOCAS Health and Safety Team members,

Please note the following:

Evacuation drills will take place in the FOCAS Research Institute on **DAY DATE MONTH at TIME** (daytime) and on **DAY DATE MONTH at TIME** (evening time).

Duties:

- **Sweep/search** rooms/areas in your location* on your way out to ensure that everyone has evacuated and has been directed to the nearest available exit
- **Exit** via the nearest available escape route, once the search is complete
- **Inform the Incident Controller** (orange hi-vis vest) that your area has been cleared and of any casualties/issues in the area you have evacuated from
- **You may be tasked by the Incident Controller** e.g. crowd control, otherwise **go to the assembly point** encouraging others to do the same

If available please wear a yellow hi-vis vest. If you do not have one, do not worry, as you can still carry out your duties even without a hi-vis vest.

*your normal work area **OR** the area you are in when the alarm goes off

Assembly Points

1. Camden Row

Communication: before an evacuation drill

Dear colleagues,

Evacuation drills took place in the FOCAS Research Institute on **DAY DATE MONTH at TIME** (daytime) and on **DAY DATE MONTH at TIME** (evening time).

Please take time to complete the evacuation evaluation form by clicking here or pasting this address http://www.dit.ie/healthsafety/evacuationevaluationform

Communication to Staff Re: Hi-Vis Vests

February 2014

Dear Colleague,

A decision was made by the College of Sciences & Health, Health & Safety Team to issue all staff members with a hi-vis vest for evacuations (drills/real events).

As a DIT staff member you are an Evacuation Marshal:

Duties:

- **Sweep/search** rooms/areas in your location* on your way out to ensure that everyone has evacuated and has been directed to the nearest available exit
- **Exit** via the nearest available escape route, once the search is complete
- **Inform the Incident Controller** (orange hi-vis vest) that your area has been cleared and of any casualties/issues in the area you have evacuated from
- **You may be tasked by the Incident Controller** e.g. crowd control, otherwise **go to the assembly point** encouraging others to do the same

If available please wear your yellow hi-vis vest. If you do not have one, do not worry, as you can still carry out your duties even without a hi-vis vest.

*your normal work area **OR** the area you are in when the alarm goes off

Do not delay or put yourself in danger

Assembly Point

Camden Row
Please do not block access to Camden Row

If you have any questions please contact your Safety Representative, Theresa.Heddermen@dit.ie who can bring a summary to the FOCAS Health & Safety Team.

Regards,
FOCAS Health and Safety Team

SOP Fire Alarm

ACTING AS INCIDENT CONTROLLER

PURPOSE:

Revision No:	1st	**Date of Issue:**	May 2013
Number of Pages:	2	**Date of Next Review:**	May 2014

- The purpose is to establish standard procedures for personnel when assuming the role of Incident Controller during an emergency situation within the premises of the Focas Research Institute, Dublin Institute of Technology.

RESPONSIBILITY:

- The Incident Controller has the task of coordinating the emergency response when the fire alarm has been activated. This includes evacuating the building and may also include investigating the source of the activation, liaising with emergency services and assisting injured parties.

- All Focas personnel are expected to act as Incident Controllers /Fire Marshalls as required.

PROCEDURE:

- Should the evacuation alarm sound for any reason, one individual must assume the role of **Incident Controller**. This will normally be a member of Focas Staff or Focas H&S Committee, but, out of hours, the role must be assumed by one of the occupants**; ideally the first one to respond should take charge.**

- Once the alarm sounders have been activated, the building should be evacuated. Once the evacuation starts it should be run to completion even if the source of the alarm is identified and resolved early on.

- **The Emergency Services (112 or 999) must be contacted straight away, unless it can be immediately confirmed that the activation is a false alarm.**

- The Incident Controller must put on an orange high visibility jacket.

- Throughout the evacuation the Incident Controller should remain close to, but at a safe distance from the main entrance so that they can liaise with Fire Marshals and the Emergency Services.

- When the Emergency Services arrive, the Incident Controller must give them the Fire Register which is located at each reception desk.

- The Incident Controller must also pass on any other relevant information to the Emergency Services. This may include information about the incident (if known), information about chemicals, gases or dangerous substances, details of persons still in the building or areas not swept.

- The Incident Controller should not allow him/herself to be unnecessarily distracted by staff or students. Anyone speaking to the Incident Controller unnecessarily should be firmly told **"The evacuation alarm is sounding, please leave the building".**

- When the Emergency Services arrive on site, the Incident Controller hands full responsibility of the building and the incident to the Emergency Services. From that point on the Incident Controller's duty is complete and they should proceed to the assembly point.

- The Buildings Maintenance Manager for the premises, Colm Gillen must be notified, 402 4646, 087 2888294 and the Head of the Focas Research Institute Hugh Byrne on 402 7900, 087 6305063 at the earliest opportunity.

The Following Procedures Relate to Spurious Activations Only;

- If it can be confirmed immediately that the alarm activation is a false alarm, the monitoring station **8058399** should be contacted straight away and advised of the situation

- The alarm should not be silenced as this could hide an unresolved problem. Procedure for deactivating and resetting the alarm. TBC by Buildings Office

- **After the evacuation has concluded and the alarm has been reset, the building should only be re-entered when the "all clear" has been given by the Incident Controller. The Incident Controller should only give the all clear if they are absolutely satisfied that the cause of the spurious activation has been identified and resolved and the alarm has been successfully reset.**

- The Incident Controller should then coordinate the resetting of all Fire Doors, Shutters, Automatic Smoke Vents and Lifts. TBC by Buildings Office

- Once the incident has been dealt with, the Incident Controller must complete an Incident Report Form located in the foyer of the Focas Research Institute and notify the Buildings Maintenance Manager for the premises Colm Gillen, 402 4646, 087 2888294 and the Head of the Focas Research Institute, Hugh Byrne on 087 6305063.

Incident Controller Report Forms

FOCAS Incident Controller Report

FLOOR				**AREAS**
4th Floor	External Roof Area		Boiler Room	
3rd Floor	General Office	CNRI lab	Meeting Room	GRS Office
2nd Floor	Offices	MSA Laboratory	Bio Eng Laboratory	Meeting Rooms
1st Floor	Offices 1	Offices 2	NanoLab/CNRI	RESC
Ground Floor	General Office	Crest Office	CNRI Office	Seminar Room
Basement	Microscopy 1 (AFM, Conf)	Microscopy 2 (EM, IEO)	Vibrational Spectroscopy	Sample Prep/ Crest

Signed: _____ (Incident Controller)

Form for Completion by Incident Controller: Drill Report

INCIDENT CONTROLLER: EVACUATION DRILL REPORT

GENERAL INFORMATION ***Please complete all sections and send a copy to the Health & Safety Office, DIT 40-45 Mountjoy Square***			
Building(s):		**Date of Drill:**	
Name of Incident Controller **(Porter on duty):**		**Signature of Incident Controller:**	
Start Time: _____ **End Time: _____** **Duration: _____**			

	PRE-EVACUATION	**Yes**	**No**	**Comments**
1	Were the Gardaí notified? (if necessary)			
2	Was the fire alarm monitoring company notified? (if necessary)			
	EVACUATION	**Yes**	**No**	**Comments**
Fire Alarm, Doors and Exits				
3	Did the fire alarm function correctly?			
4	Was the alarm audible throughout the building(s)?			
5	Did all fire doors operate correctly?			
6	Were all exits clear and unobstructed?			
Occupants, Assembly Point(s)and Traffic				
7	Did all occupants evacuate safely without delay?			
8	Did all occupants with disabilities evacuate safely?			

9	Was the lift used?			
10	Did all occupants go to the Assembly Point(s)?			
11	Were there any issues with traffic?			
12	Did unauthorised re-entry to the building(s) occur before the "all clear" was given?			
Evacuation Marshals				
13	Were adequate numbers of marshals present?			
14	Did marshals direct people adequately?			
15	Did marshals have sufficient equipment e.g. hi-vis vests?			
16	Did marshals report problems/issues to the Incident Controller?			

Appendix 5

FOCAS Research Institute Chemical and Biological Safety Protocols

CHEMICAL AND BIOLOGICAL HAZARDS, STORAGE AND DISPOSAL

CPL and CLP

Information on hazard and risk can be obtained from the label of the chemical and from the safety data sheet for that chemical. We are currently in a transition period and will have to engage with **TWO** distinct formats to which chemicals and mixtures (preparations) will be labelled until June 2017. In the next sections the requirements of the old system under CPL Regulations and the new system under CLP Regulation will be explored briefly.

The Old System (CPL)*Classification under CPL (Old) Regulations*
Chemical substances and preparations are collated into various EU hazard classifications associated with their physiochemical hazards, health and environmental hazards in accordance with the labelling legislation (CPL (old system). Criteria for classifications are outlined in this EU based legislation.

Labelling under CPL (Old) Regulations

Each hazard class of chemical is indicated by a symbol and sometimes an associated letter indicating its hazard group. These symbols should be clearly visible on the outside of the chemical container and visually identify the hazard to the user. You must be familiar with the hazard warning sign.
See Table 1 on next page

Risk Phrases and Safety Phrases

Chemicals are tested extensively to identify the hazard class (refer to 6.1) and the risk associated with the chemical before they are labelled. Prescribed **risk phrases** are given in the CPL Regulations (List of current risk phrases are given in appendix v).

Safety phrases are designed to give information to the user on how to use chemicals safely (Prescribed current safety phrases are given in appendix v).
.

EXPLOSIVE (E)

Explosive materials are capable of producing an explosion or will release a substantial instantaneous amount of heat and gas under the right conditions. Explosions can be initiated by heat, static or friction.

OXIDISING(O)

Oxidising agents are chemicals that can react with chemicals that are oxidisable. These agents release oxygen and heat.

HIGHLY/ EXTREMELY FLAMMABLE/ (F/F+)

The vapours of highly flammable (Flash pt 0-21°C) substances will catch fire, whereas extremely flammable substance (Flash Pt <0°C) will catch fire when exposed to an ignition source.

(Highly)TOXIC (T+/T)

Toxic agents can cause serious damage to health if they are allowed to enter the body.

Dangerous for Environment (N)

These chemicals may present a risk to one or more aspects of the environment (flora, fauna, and aquatic environment). Their use and disposal must be carried out in such a way as to prevent any uncontrolled releases into the environment.

Harmful

Irritant (Xi)

Harmful: Harmful chemicals can cause damage to the health of persons if exposed to them. Prolonged exposure can cause serious damage to health.

Irritant: Chemicals that cause inflammation of the skin, respiratory system or other parts of the body (e.g. eyes) following any exposure.

CORROSIVE (C)

Corrosive materials have an ability to burn biological tissues or materials. The exposure of corrosive chemicals can occur through inhalation of the chemical, skin contact with the chemical or ingestion of the chemical in the forms of fumes, vapours or fine dust

Identifying Carcinogens under CPL (Old) Regulations
There are situations where particular care must be taken when using certain chemicals. Carcinogens, mutagens and reproductive toxins (CMRs) have the potential to cause cancer and/or have an effect on subsequent generations are specifically controlled by the SHWW Carcinogen Regulation 2001. Carcinogens can be identified by their label.

Classification	Symbol	Information	Use
Category 1 and 2 carcinogen: Toxic (T)		Substances known to cause cancer in humans and animals or should be regarded as if they do so. R45 R49	Used under strict control measures, exposure to the agent must be eliminated or reduced significantly. Zero exposure to any carcinogen must always be the user's main aim.
Category 3 carcinogen: Harmful (Xn)	 **Harmful**	Cause concern as having possible carcinogenic effects to humans, but which sufficient information is not available R40	Treated the same as with categories 1 and 2 i.e. treat as if it is a known carcinogen to humans.

A **specific risk assessment for CMRs** with additional requirements is required if you work with a CMR. In addition a **RECORD** of the use of a Class 1 or 2 CMR must be recorded by the technician in a record book specific for this purpose

Identifying Sensitisers under CPL (Old) Regulations
Sensitisers are substances that have the ability to cause an allergic reaction in 'sensitive' individuals.
Respiratory sensitisers affect the respiratory system and can lead to asthma.
Skin sensitisers affect the skin and can lead to rashes, dermatitis and eczema.
In order for a person to get 'sensitised' they must come in contact with the substance usually over a period of time. Therefore it is essential that when using a sensitiser strict precautions are in place to minimise contact and therefore minimise the chance of sensitisation occurring.
Respiratory sensitisers are classified as **HARMFUL (Xn**) and carry the risk phrase **R42** ***'may cause sensitisation by inhalation.'*** Skin Sensitisers are classified as **IRRITANT (Xi)** and carry the risk phrase **R43** ***'may cause sensitisation by skin contact.'***

The New System (CLP)*Classification under CLP (New) Regulations*

Chemical substances (from Dec 2010) and mixtures (from June 2015) are collated into various GHS hazard classifications associated with their physiochemical hazards, health and environmental hazards in accordance with the labelling legislation CLP (new system). Criteria for classifications are outlined in the legislation (purple book) and are in line with GHS. One hazard:-one classification:-one label:-WORLDWIDE.

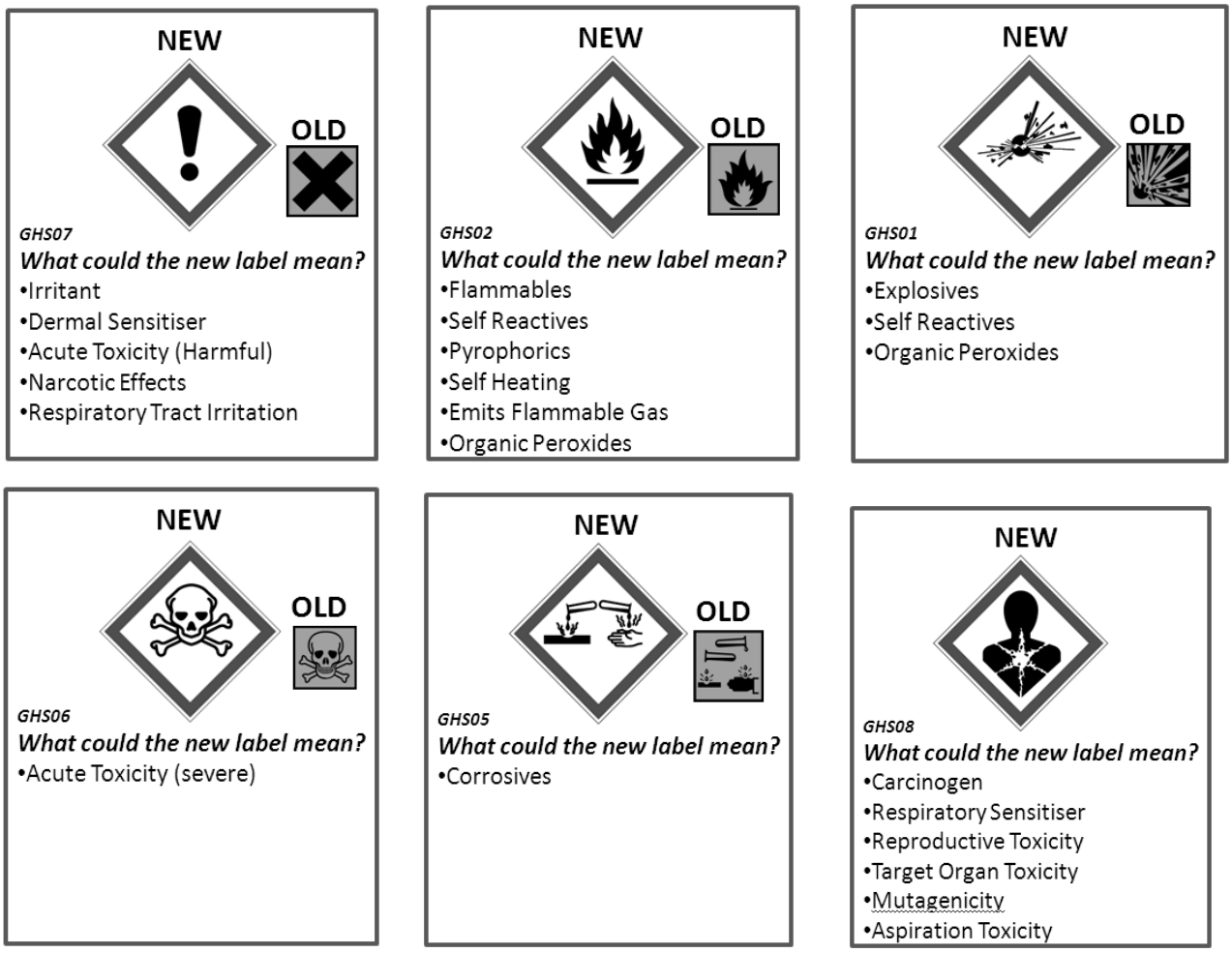
Labelling under CLP (New) Regulations

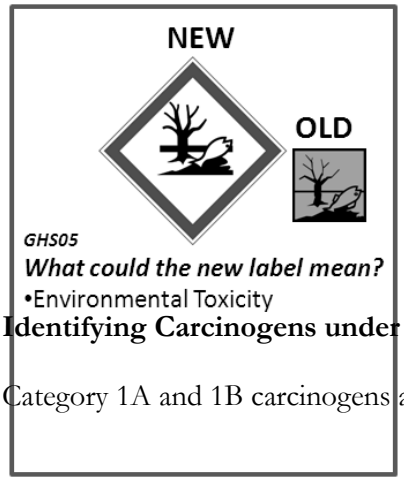
Each hazard class of chemical is indicated by a pictogram indicating its hazard group. These pictograms should be clearly visible on the outside of the chemical container and visually identify the hazard to the user. You must be familiar with the hazard warning pictogram.
See Table 2 on next page. For further details on GHS please refer to the Health and Safety Authority website (www.hsa.ie)

Hazard and Precautionary Statements

Chemicals are tested extensively to identify the hazard class (refer to 2.2) and the risk associated with the chemical before they are labelled. Prescribed Hazard Statements (H) are given in the CLP Regulations. (List of current Hazard statements are given in appendix 1 B)
Precautionary Statements are designed to give information to the user on how to use chemicals safely. (Prescribed current safety phrases are given in appendix 1 B)

New chemical labeling – globally harmonised system (GHS)





Identifying Carcinogens under CLP (New) Regulations

Category 1A and 1B carcinogens are labelled as indicated below.

Classification	Symbol	Hazard statement
Carcinogen Cat 1A Cat1B	 **DANGER**	**H350** May cause cancer **H350i** May cause cancer by inhalation.
Carcinogen Cat 2	 **WARNING**	**H351** Suspected of causing cancer.

Identifying Sensitisers under CLP (New) Regulations

Hazardous substances that can cause an allergic reaction carry the hazard pictogram and are labelled with the hazard statements outlined below.

For Category 1(A and B) sensitisers

DANGER H334 May cause allergy or asthma symptoms of breathing difficulties if inhaled

WARNING H317 ` May cause an allergic skin reaction.

Pregnant Women

Studies have demonstrated that a number of chemicals may interfere with pregnancy or with the development of the unborn baby. These chemicals can be identified from their risk phrases. The first 15 weeks of pregnancy are when chemicals can impact most. It is therefore imperative that when a woman is pregnant or thinks she may be pregnant **she informs her line manager or class supervisor** who will arrange for a specific 'Pregnant woman' risk assessment to be undertaken by the Occupational Health Officer on site in line with the procedure outlined on http://www.dit.ie/services/healthsafety/procedures/Chemicals

which are specifically considered can be identified by their associated risk phrases. Risk phrases where the risk must be reassessed ***(R40, R45, R47, R49, R60, R61, R62, R63, R64).*** The equivalent Hazard Statements (Insert H numbers here) must also be considered.

Safety Data Sheets (SDS)

Safety data sheets are documents prepared by the chemical supplier that give detailed information on the chemical and how to handle it safely. Safety data sheets identify hazards associated with a material and how the material can be safely handled, stored and used.
SDS for the chemicals used are available in all laboratories. SDS are provided by the chemical supplier and gives detail on many aspects of the chemical safety. Safety data sheets are available for a large number of chemicals and can be downloaded from the web. Useful websites include:
http://www.sigmaaldrich.com/ireland.html where SDS for substances can be sourced. If you are working on a project the SDS must be available in the area in which you work. SDS must conform to the EU standard as outlined by the REACH regulation 2007. The format is same worldwide. The Sections of a SDS include:

	Title	**Information**
1	Chemical identification	Name and manufacturer number
2	Hazards identification	Hazards and risks (R or H) associated with the material. Details of the label.
3	Composition/information on ingredients	CAS Number, molecular formula, list of common synonyms
4	First Aid measures	First aid measures to be taken if exposed to the material
5	Fire fighting measures	Responses to be taken during a fire involving the material
6	Accidental release measures	Details how to respond to a leak or spill of the material.
7	Handling and storage	The requirements for handling and storing the material safely.
8	Exposure Controls/personal protection	Information on protection requirements if exposed to the material.
9	Physical and chemical properties	Information on the appearance and chemical properties of material.
10	Stability and reactivity	information on material stability and ability to react with other materials.
11	Toxicological information	Information on the severe and chronic effects if exposed to the material
12	Ecological information	The impact the material has on the environment
13	Disposal Considerations	correct disposal procedure for the material in question
14	Transport information	information on the means of transporting the material
15	Regulatory Information	Declaration of EU conformance.
16	Other Information	Relevant risk and safety phases and other regulatory information Information such as a disclaimer from the producer of the SDS.

In general a copy of the SDS should be replaced with an updated copy every 2 years. Check that the SDS you refer to has been updated recently.

Routes of Entry of Chemical Agents into the Body

For the chemical to harm to the health of the person using it, the chemical must come into contact with them. Factors that will affect the impact a chemical has on the biological system include the following parameters.

- Inherent Hazard (how toxic, harmful etc the chemical is)
- Dose (how much gets into the body) at which it exerts its effect.
- Metabolism (what it changes into) and how long it stays in the body (and at what conc.)

There are four main routes by which chemical agents can enter the body. These routes are as follows

Routes of Entry	
Inhalation	This is the most important route of entry. Inhalation occurs by absorption of a chemical through the respiratory tract via inhalation. Inhalation of solvent vapour can be very dangerous as the surface area available within the lungs for the absorption of chemical agents is many times greater than that available on the skin.
Skin contact	Skin contact represents the most common route of chemical entry into the body. Chemical agents can enter the body if they come into contact with damaged skin e.g. cuts and abrasions.
Ingestion	The material enters the body through the mouth (swallowing). Direct ingestion is considered unlikely in the laboratory however, ingestion of toxic materials may occur as a result of eating in a contaminated work area or with dirty hands.
Injection	Injection occurs when a material is introduced directly into the bloodstream. Injection can occur through mechanical injury from sharp objects e.g. syringe, needle or broken glass

The most common route of exposure is by inhalation. It is therefore essential that the concentration of a chemical in the air is kept to a minimum. The ingestion of food and drink is forbidden in the laboratory to minimise the risk of ingestion. When handling chemicals it is essential that contact with the chemical is kept to a minimum. Hands are washed immediately after each laboratory session or if there is inadvertent contact with the chemical (e.g. splash). For particularly hazardous chemicals the use of appropriate chemical resistant gloves may be required. This will be indicated in the laboratory manual and in the chemical risk assessment. The type of glove to be used will also be indicated (e.g. heavy duty rubber glove, nitrile etc.). In the laboratory safety measures are in place to prevent or minimise the risks associated with the use of chemicals.

Exposure limits

The SHWW Chemical Agents Regulations (2001) prescribe exposure limits for **airbourne** hazardous substances **(OELVs).** They are quoted as a time weighted average (TWA) which means that they indicate the safe amount that a healthy adult can be exposed to for a given time (usually 8 hrs). For particularly hazardous substances a Short Term Exposure Limit (STEL 15 mins) is in place. These limits are available in the Code of Practice (2010) for Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001, which can be downloaded from www.hsa.ie and is updated regularly. Every person using a chemical agent must design their working practice so as to eliminate or reduce to as low a level as possible their exposure to that agent.

Chemical Storage

Proper and correct storage of all chemicals must be in place to minimize hazards associated with leaks, spills and accidental mixing of incompatible chemicals. The SDS can be used as guidance before storing the material in order to obtain information on the materials incompatibilities. A minimum amount of chemicals and solutions should be stored in the laboratory area. Extremely/highly/ flammable chemicals must be stored in flame proof cabinets and safety fridges as appropriate. Chemicals are stored based principally on their UN-Hazard class (section14 of SDS) in dedicated chemical storage areas. All personnel are responsible for the proper storage of chemicals in the laboratory and storage areas with which they are associated.

When chemicals are stored in a laboratory the following precautions should be taken:

- All chemical containers (including samples) in the laboratory areas must be labelled with the name of the chemical, its hazard class and risk phrases. The name of the person labelling the chemical must also appear. A disposal date must also be given.
- Check with the laboratory technician (Core) or designated person (Centre/Group) if you intend to store materials in the laboratory.
- Some chemicals degrade during storage and may become more hazardous and therefore it is crucial that quantities of hazardous chemicals stored be kept to a minimum.
- Chemicals that are affected by sunlight must not be stored in an area where they can be exposed to direct sunlight
- Chemicals must not be stored under sinks.
- Leaking or damaged packages must be removed to a safe area for repacking or disposal
- Solids should be stored on shelves or in cabinets unless stated otherwise.

Chemical Waste Disposal

It is extremely important that all the waste produced in the Focas Research Institute is disposed of in a correct, safe and legally compliant manner to avoid any unnecessary problems. Failure to dispose of waste correctly may result in prosecution of both the Focas Research Institute and the individual involved. All chemical waste containers must be clearly labelled to indicate the nature of the waste material. It is the responsibility of the technical staff to organise the removal of 'collected' hazardous waste from the site. Methods of disposal of waste are documented in the practical procedure in the laboratory manual and must be adhered to. The CRA documents how waste generated in the procedure which is risk assessed is to be disposed off.

Information on the disposal of waste is available in the SDS.

Waste	**Means of Disposal**
Aqueous waste	**All aqueous waste is neutralised and is poured down the sink and diluted well with plenty of water.**
Solid	**All solid samples must be submitted to the supervisor in a sample bottle. Consult the supervisor if there is any solid waste and it will be disposed of appropriately.**
Organic:	**All organic liquid waste (not water miscible) is to be neutralised and poured into the waste solvent bottle labelled organic waste in the fume cupboard.**
Chlorinated.	**All chlorinated organic waste is to be neutralised and poured into the chlorinated waste solvent bottle**

General methods of disposal for SMALL amounts of waste are given in the practical procedure and CRA.

Solid Chemical Storage and Waste Disposal

Solid waste produced from synthetic organic and inorganic experiments (unless explosive, flammable or otherwise considered dangerous for transport according to ADR regulations) can be broadly divided into two classifications for transport and disposal.

UN No. 2811, Toxic Solid Organic NOS, Class 6.1 Packaging Group 1
UN No. 3288, Toxic Solid Inorganic NOS, Class 6.1 Packaging Group 1

Procedure for collection, storage and disposal
General Synthetic Laboratory Solid Waste

- Separate samples into organic and inorganic waste materials
- Waste produced should be collected in suitable sealed containers within the laboratory.
- To prevent any unforeseen reaction, different waste solids should not be collected/stored in the same container.
- These smaller individual sealed containers should be transferred to the appropriately labelled disposal container provided
- Pack with sufficient vermiculite to prevent breakage of contents
- Waste materials come under the same segregation policies outlined for general chemical storage
- Large quantities of waste products should not be stock piled
- Once per year, or when full, containers are sealed and disposed of by registered waste disposal company

Waste generated foreseen not to fall within the above categories or which may pose additional safety concerns should be assessed on a case by case basis. Any such waste must be identified clearly and if available the SDS should be consulted with respect to classification and incompatibilities. A registered waste disposal company should be contacted with respect to collection and disposal. Copies of all C1 forms and certificates of destruction should be retained for all chemical waste and stored in the Institute Waste Register.

Chemical spills

General Spill procedures
In the case of a spill or leak of chemical the following procedures should be carried out.

- The area must be cordoned off and access to area restricted
- Area must be kept well ventilated.
- **APPROACH THE SPILL ONLY IF SAFE TO DO SO.**
- **WEAR PPE: SAFETY GLASSES AND GLOVES (check type in CRA or SDS) before approaching the spill. For larger spills breathing apparatus may be required and is available. You must be trained to use BA when cleaning up a spill.**
- If the spilled material is extremely/highly/ flammable all sources of ignition must be turned off if safe to do so.
- The CRA must be consulted.
- The SDS for the chemical concerned must be consulted before dealing with the spill

- The source of the leak should be identified and sealed if safe to do so.
- All wastes and all contaminated items generated by spillages must be disposed of in a suitable manner.
- Individual spill procedures are outlined in the laboratory manual and in the CRA.

Spill procedure (up to 250cm³)
In addition to consulting the laboratory procedure and CRA:-
WEAR APPROPRIATE PPE

- Mop up solid waste (up to 5g) with a damp tissue and rinse well with water before putting in the bin.
- Wipe up organic spills with tissue and leave in the fume cupboard to evaporate for at least 1 hr. Inform the technician.
- Acid or base spills must be neutralised and diluted well before collection. Rinse any tissue used well with water before disposal

Spillage procedure (> 250cm3)

- Supervisor must be consulted so that they can deal with the situation appropriately.
- Spillage kits are available in the laboratory. All spillage kits must contain the following: Absorbent booms, Absorbent pads, Dry absorbent material, bush and
- pan, General purpose broad range disposable mask, Heavy duty gloves, Safety glasses waste bag/ Empty container.
- Solid waste must be collected with the minimum of dust generation and disposed off as hazardous waste in consultation with the technician.

Code of practice for clean-up of a chemical spill

Solid chemical spill
Background information

- If any of the following are true, then the situation should be considered highly hazardous.
  - Is the chemical toxic or a CMR toxin?
  - Is the material a fine powder?
  - Is there a danger of adverse chemical reaction?
  - If any of the above is true, evacuate the immediate area.
- Gather relevant information on the chemical from the Safety Data Sheet (SDS), including its:
  - Reactivity
  - Flammability
  - Explosive nature
  - For example peroxide forming chemicals
  - Corrosive nature
  - Oxidising power
    - For example nitrates, permanganates and perchlorates should be disposed of separately to combustible material.
  - Toxicity
- Gather the appropriate Personal Protective Equipment (PPE) necessary for the clean up. This information is available in the SDS, and may include:
  - A respirator (type P2 as a minimum) if the material is toxic or a fine powder
  - Safety glasses or goggles to prevent eye irritation
  - Gloves to prevent skin absorption or irritation
  - Disposable overalls/lab coat
- Gather material necessary to aid in the clean up, including:
  - Wet paper towel or similar to cover the spilt material
  - Damp sand or saw dust may be of assistance in cleaning up

- A shovel or dustpan to collect the material
- A container for disposal

Clean-up

- Do not tackle a clean-up procedure by yourself. As a minimum there should be two persons involved. e.g. one to clean up the spill and one to observe.
- Cover the spilt powder with the wet paper towels (or similar items), or use damp sand.
- Carefully shovel this mixture into the disposal container. This method should not be used on substances that in contact with water emit flammable gases or become spontaneously flammable.
- Clean yourself and any equipment as close to the site as possible, without spreading the material around.
- Place material in a suitable container and contact a registered disposal company to arrange for safe disposal

Code of practice for clean-up of a liquid nitrogen spill

For minor spillages (<1 litre) of liquid nitrogen the following protocol should be followed:

- Evacuate the immediate area.
- Allow liquid to evaporate, ensuring adequate ventilation
- Following return to room temperature inspect area where spillage has
- occurred
- If there is any damage to the floors, benches or walls inform the buildings office
- If any laboratory equipment has been damaged following the spillage inform the laboratory co-ordinator /supervisor

For major spillages (>1 litre) of liquid nitrogen the following protocol should be followed:

- Evacuate the immediate area
- Inform emergency services on internal telephone 999/112
- If present ensure that the oxygen depletion sensor has been reset before re-entering the room.
- In the event that an oxygen depletion sensor is not present do not return
- to the area until it has been declared safe

Standard Operating Procedure for the Neutralization of Strong Acids and Bases

Although technically not waste minimization, neutralization of strong acids and bases can reduce the size of your laboratory's and KSU's aqueous waste stream. Neutralization is the most efficient and least costly way of managing waste acids and bases. This bulletin addresses the neutralization of the acids and bases listed below. After neutralization, waste liquids can be disposed of in the sanitary sewer.

Solutions that should not be neutralized:

The solution you plan to neutralize should not contain heavy metals such as arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. Wastes containing high levels of other metals may be of concern, as well. Acids that are very reactive with water should not be neutralized, unless you have expertise in handling and using them. These include: acid anhydrides and chlorides; chlorosulfonic acid, fuming nitric and sulfuric acids; liquid halides of boron, silicon, tin, titanium and vanadium; and liquid halides and

oxyhalides of phosphorus, selenium and sulfur. Due to extreme safety considerations, **you should also not attempt to neutralize hydrofluoric acid.**

Personal protection and equipment
Carry out neutralizations in a well-ventilated fume hood. Use the sash or a safety shield for protection against vigorous reactions. Wear a chemical resistant apron, splash-proof goggles or a full-face shield and nitrile gloves. Long gloves or gauntlets are also recommended. A five gallon polyethylene bucket is recommended for neutralizing 1-10 liters. A large container is needed in acid neutralization for addition of ice and base, and to safely stir the reaction.

Procedures
Neutralization of strong bases
1. Bases that may be neutralized include: solutions of potassium and sodium hydroxides, alcoholic sodium or potassium hydroxide cleaning solutions, ammonium hydroxide and ammonia solutions.

2. Dilute the base to a 5% (by weight) concentration or less.

3. Slowly add 6 N hydrochloric acid or other acid.

4. Monitor pH changes with pH meter or pH paper. (Note: Liquid indicators can oxidize rapidly in basic solutions and give false colour change).

5. When pH is between 6 and 10, solution can be washed down sanitary sewer with 20 parts water.

Neutralization of strong acids
1. Prepare a 6 N solution of sodium hydroxide (240 g/ L) or potassium hydroxide (336 g/ L).

2. One liter of 6 N base can neutralize:

Acid	Quantity mL
Acetic acid (glacial)	342
Formic acid (88%)	264
Hydrochloric acid	504
Hydrobromic acid (48%)	720
Hydriodic acid (47%)	1080
Hydrobromic acid (48%)	720
Nitric acid (70%)	378
Perchloric acid (70%)	516
Phosphoric acid (85%)	414
Sulfuric acid (96%)	166
Trichloroacetic acid (20% soln.)	4902

3. Dilute the acid to a 5% (by weight) concentration or less (add acid to water, NOT water to acid). Use ice as necessary to cool the solution. Limit the solution to a maximum of 10 litres. Acids may generate heat upon neutralization.

4. Neutralize with 6 N sodium hydroxide or potassium hydroxide, adding it slowly.

5. Monitor pH with pH paper, a pH meter, or a suitable indicator.

6. When pH is between 6 and 10, wash solution down the sanitary sewer using 20 parts water.

Biological Hazards

Control of biological hazards is through good laboratory practice when in contact with potentially hazardous biological samples. All new staff/students are required to read and understand the RESC laboratory 'Standard Operating Procedures manual' for biological safety. A demonstration of safety procedures in the RESC laboratory is given to all new staff/students before commencing work in the laboratory. One to one training of new methods/procedures is given as required to new staff/students by senior staff and supervisors. Protective clothing and gloves must be worn at all times when handing such material and protective goggles should be worn where necessary. It is RESC policy to advise all personnel planning to work with potentially infectious samples (e.g. human blood and unfixed tissue samples) to receive vaccination against hepatitis B. When working with biological samples, they must be placed in a laminar flow hood (class II cabinet) which has been switched on 15-20 mins prior to use to ensure sufficient airflow and to eliminate aerosols. Strict rules on correct waste disposal are adhered to in the RESC laboratory as described below. Before leaving the laboratory hands must be thoroughly washed with anti-bacterial soap. Eating or drinking is strictly prohibited in the RESC laboratory.

Biological Waste disposal

On completion of the work, gloves and any biological waste must be disposed of according to waste disposal procedures described below:

Liquid waste

All liquid waste must be disposed of safely using disinfectants. Disinfectants used in the RESC laboratory for liquid waste, contaminated lab equipment, materials and work areas are:

- Virkon
- Savlon
- Milton sterilising fluid
- Methylated spirit
- Labguard microbial handsoap

Virkon is the most effective disinfectant used in the RESC laboratory as it is proven effective against HIV/AIDS and Hepatitis B & all other viruses. A 1% solution is used.

All liquid waste must be disposed of safely by adding to a discard beaker containing 1% Virkon in the laminar flow hood. After leaving to stand for at least 30 minutes, liquid waste can be disposed of in the cell culture laboratory sink with copious amounts of running water.

Any spillages of blood should be covered with Virkon powder and left for 3 minutes. The powder should then be scraped into a receptacle for disposal and the area should be disinfected with 1% Virkon. 1% Virkon is only stable for 7 days and should be freshly prepared each week. Savlon (chlorhexide gluconate and 1.5% w/v cetramide) and Milton sterilising fluid (2% sodium hypochlorite) are also used in the laboratory for disinfection purposes. Methylated spirit is used for aseptic technique during cell culture eg. spraying bottles, flasks, pipettes before placing in the laminar flow hood. Labguard microbial soap (2% nonoxynol) is used for hand washing before leaving the laboratory.

Solid waste

Uncontaminated waste, such as paper and packaging should be disposed of in the black refuse sacks in the designated bins. Contaminated biological waste should be disposed of as follows: Any waste human tissue must be sealed in a disposable plastic tube and packed into an autoclave bag and autoclaved at 120^{o}C for 1 hour for complete sterilisation. This autoclaved bag of waste should then be placed in a yellow biohazard bag in one of the designated bins. All plastic waste and gloves must be disposed of in the yellow biohazard bins.
When full, all yellow bags must be tied with a coded tag available in the laboratory. Care must be taken to ensure that no liquids are placed in these bags (all flasks and plates etc should be emptied and the liquid handled as described for liquid waste disposal) and that the bags are not pierced by pipettes etc. The tags can be traced back to the laboratory so care must be taken in ensuring that these yellow bags are completely sealed.

Microbiological Infectious waste

This laboratory is housed within the Nanolab research centre. All conditions set out for work within the centre in the Nanolab risk assessment and safety statement apply and must be adhered to. The following risk assessment details the specific considerations, procedures in place and conditions for the use of the microbiological facility within the Nanolab research centre.

All staff and users of the facility must familiarise themselves with and be aware of possible routes of transmission when working with potentially infectious materials in the Nanolab Microbiological facility.

Route of Transmission: The "route(s) of transmission" is/are the mechanism(s) by which an infectious agent is spread among humans. Predominant routes of transmission in the laboratory are:
1) direct skin, eye or mucosal membrane exposure to an agent;
2) parenteral inoculation by a syringe needle or other contaminated sharp;
3) ingestion of liquid suspension of an infectious agent, or by contaminated hand to mouth exposure; and
4) inhalation of infectious aerosols.

An awareness of the routes of transmission for the natural human disease is helpful in identifying probable routes of transmission in the laboratory and the potential for any risk to public health, but it is important to remember that the nature and severity of disease caused by a laboratory infection and the probable laboratory route of transmission of the infectious agent may differ from those of the naturally-acquired disease.

Risk Assessment.

Item	Description	Compliance level and Measures in place
Doors	Lab has closing lockable doors. Control access to the laboratory. All personnel entering the lab must be advised of the potential hazards and meet specific entry/exit requirements.	**Compliant**
Sink	There must be at least a manually operated or hands-	**Compliant.** **Note** - Sink present in Microlab

	free hand washing sink available near the laboratory exit for hand washing after working with potentially hazardous materials and before exiting the laboratory	(will need to be adapted to larger unit). Sink in Main Lab can be used prior to exit of the laboratory until lab can be altered.
Food and Drink	Eating, drinking, smoking, handling contact lenses, applying cosmetics and storage of food for consumption are not permitted in the laboratory	**Compliant.** Signs up in lab.
Mouth Pipetting	Mouth pipetting is prohibited; mechanical devices must be used	**Compliant.** Multiple mechanical pipettes available.
Sharps	Policies for safe handling of "bio-sharps" are developed and implemented	**Compliant.** Regular sharps bins available in lab. Bio-Sharps bins available and disposed through the appropriate channels of Bio waste.
Splashes and Spills	GLP is mandatory; all personnel must meet appropriate standards and individual's competence level be verified by lab manager. GLP must be performed to minimize the creation of splashes and/or aerosols.	**Compliant.** If spill occurs the responsible personnel must take appropriate measures to clean and isolate the spill and log the incident with details of decontamination procedures performed.
Work Surfaces	Work surfaces are decontaminated after completion of work and after any spills or splashes of potentially infectious material with appropriate disinfectant. Laboratory equipment is decontaminated routinely, before repair or maintenance, and after spills and splashes with contaminated material.	**Compliant.** Appropriate disinfectants and Alcohol available in the lab.
Microorganism usage	Only organisms from recognised sources (commercially labelled vials or commercial microbial ID KITs provided by user to ensure organism authenticity) can be brought into and used within the facility. All new micro-organisms must be verified authentic by lab manager to ensure the protection of all other users and staff.	**Compliant.** This is **on-going** as organism stocks and banks are added to and updated with time.

Waste	All potentially infectious laboratory waste is decontaminated before disposal (e.g. autoclave, chemical disinfection, incineration, etc.)	**Compliant.** **Note** - infectious waste is decontaminated outside of the immediate laboratory, the infectious material must be placed in a durable, leak proof container and secured for transport. All personnel must take sole responsibility for their own experimental waste and must be left ready for decontamination at the end of each day by lab manager.
Signage	A biohazard sign is posted at the entrance to the laboratory. Sign must include the following information: the laboratory's biosafety level, the supervisor's or other responsible person's name, telephone number, and the required procedure for entering/exiting the laboratory	**Compliant.**
Training	All personnel have received appropriate training regarding their duties on the necessary precautions to prevent and evaluate exposures and have demonstrated competency in standard and special microbiological practices	**Compliant.** **On-going** as new personnel start to use the facility
Reporting	Incidents that may result in exposure to infectious materials are immediately evaluated and reported to a responsible person. .	**Compliant.** If necessary, treatment is provided, and documentation of the incident is recorded and recommendations made to the individual for further medical treatment if necessary.
PPE	Personal protective equipment, laboratory coats, gloves, eye, face and respiratory protection are available and appropriately used. Protective clothing is removed before leaving for non-laboratory areas.	**Complaint.**
Eye wash Station	An eyewash station is readily available.	**Compliant.** Station available in main RESC lab on same floor.
BSC II	All procedures involving the manipulation of infectious materials that may generate an aerosol are conducted within a properly maintained and	**Compliant.**

	annually certified BSC (preferably Class II) or other physical containment device. The BSC must be installed so that fluctuations of room air supply and exhaust do not interfere with proper operations. The BSC is located away from doors, windows, heavily travelled areas and other possible airflow disruptions.	
Windows.	Windows in the laboratory that open to the exterior are not recommended, but any present must be fitted with screens	**Compliant.** No windows present in designated microlab area.
Bench Tops	Bench tops are impervious to water and resistant to heat, organic solvents, acids, alkalis and other chemicals.	**Compliant.** All lab bench tops have been installed by a recognised supplier and meet HSAI guidelines for laboratory surfaces.
Lab	The laboratory design allows for easy cleaning (e.g. no rugs or carpets, chairs covered in a non-porous material).	**Compliant.**
Ventilation.	The laboratory has sufficient air exchanges (e.g. 6-8 exchanges/hour) and exhausts away from occupied areas to clear the air in the event of a spill.	**Compliant.**

Glossary of Terms and Acronyms

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.
Biosafety Cabinet (BSC): A BSC is a physical containment device that is designed to provide personnel, environmental and product protection from biological hazards. It is not the same as a chemical fume hood. Biological safety cabinets are designated as Class I, II or III, based on their capabilities. Most BSCs (except Class I) use high efficiency particulate air (HEPA) filters in the exhaust and supply systems.

- A Class I biological safety cabinet is designed to protect personnel and the environment, but not the product.
- A Class II cabinet must meet requirements to protect product, personnel and the environment.
- The Class III biological safety cabinet is designed for maximum protection for work involving highly infectious microbiological agents or hazardous operations. It is gas-tight, with manipulation of materials only via long, heavy-duty rubber gloves attached to ports.

Biosafety Level (BSL): A combination of work practices, equipment, and facilities to minimize the exposure of workers and the environment to infectious agents. Laboratory biosafety levels are designated by four ascending containment levels (BSL-1, BSL-2, BSL-3, and BSL-4) based on risk criteria of agent infectivity, severity of disease, transmissibility, the nature of the work being conducted, and the origin of the agent.

Biosafety Level 1 (BSL-1): Suitable for work involving well-characterized agents not known to consistently cause disease in immunocompetent adult humans, and present minimal potential hazard to laboratory personnel and the environment. BSL-1 laboratories are not necessarily separated from the general traffic patterns in the building. Work is typically conducted on open bench tops using standard microbiological practices. Special containment equipment or facility design is not required, but may be used as determined by appropriate risk assessment. Laboratory personnel must have specific training in the procedures conducted in the laboratory and must be supervised by a scientist with training in microbiology or a related science. Represents a basic level of containment that relies on standard microbiological practices with no special primary or secondary barriers recommended other than a sink for hand washing.

Biosafety Level 2 (BSL-2): Builds upon BSL-1. BSL-2 is suitable for work involving a broad spectrum of indigenous agents that pose moderate hazards to personnel and the environment. It differs from BSL-1 in that 1) laboratory personnel have specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures; 2) access to the laboratory is restricted when work is being conducted; and 3) all procedures in which infectious aerosols or splashes may be created are conducted in biosafety cabinets (BSCs) or other physical containment equipment. Secondary barriers such as hand washing sinks and waste decontamination facilities must be available to reduce potential environmental contamination.

Decontamination: Procedure to reduce or eliminate chemical or biological agents to a safe level so they are no longer hazards.

Disinfection: Process of eliminating some (but not necessarily all) of the pathogenic microorganisms in or on a material.

HEPA: A High Efficiency Particulate Air filter is a filtration system that removes at least 99.97% of airborne particles that are at least 0.3 micrometers (μm) in diameter. HEPA filtration is often used in biosafety cabinets, may be used in respirators, biosafety level 3 laboratory air systems, etc.
Infectious Dose: Number of organisms necessary to cause infection. The ID50 is the "50% infectious dose" or number of organisms necessary to infect 50% of those exposed.

Mask: Facemasks are loose-fitting, disposable masks that cover the nose and mouth, including products labeled as surgical, dental, medical procedure, isolation, and laser masks. Facemasks help stop droplets from being spread by the person wearing them and keep splashes or sprays from reaching the mouth and nose of the person wearing the facemask. They are not designed to protect the wearer against breathing in very small particles.

Personal Protective Equipment (PPE): Material (which may include clothing, masks, respirators, face shields, goggles) which is used to protect employees from workplace injuries or illnesses. In the microbiology laboratory, PPE is usually intended to prevent contamination of an individual by chemical or biologic agents.
Respirator: A device worn by an individual to prevent the spread of microorganisms between individuals or to protect the wearer from inhaling microorganisms, dusts, fumes, vapors, and/or gases. Respirators come in a wide range of types and sizes used by the military, private industry, and the public. N95 respirators filter at least 95% of airborne particles. N100 respirators filter at least 99.97% of airborne particles.
Sharps: Any device/item having corners, edges, or projections capable of cutting or piercing the skin or disposal containers is considered a "sharp", including needles, scalpels, pipettes, and broken glassware.
Standard Precautions: A set of protective actions (such as use of personal protective equipment) applied to all patients and patient specimens to prevent skin and mucous membrane exposure and reduce the risk of transmission of microorganisms in the healthcare setting. All blood, tissue, body fluids, secretions, and excretions (except sweat) are considered potentially infectious.

Sterilization: A process that eliminates or kills transmissible agents (e.g., bacteria, fungi, viruses, etc.) from materials (e.g., surfaces, food, culture, etc.)

Nanolab microbiological lab Usage Agreement.

All users of the facility must comply with the safety statement of the laboratory for the protection of all other users.

Detailed project specific risk assessments must be provided in advance of work commencement and submitted to the lab manager for approval.

Submitted risk assessments must include explicit details of all microorganisms to be employed in the study.

Work with certain microorganisms is not permitted within the facility, decisions are made by Nanolab management via the submitted experimental risk assessments.

Only work with lab manager approved microorganisms can be carried out in the Nanolab microbiological laboratory.

No substitutions can be made to experimental organism lists without prior approval of the lab manager and the submitted risk assessment must be updated accordingly.

All organisms must be stored in the appropriate means, labelled clearly and correctly.

Only organisms from recognised sources (commercially labelled vials or commercial microbial ID KITs provided by user to ensure organism authenticity) can be brought into and used within the facility.

All new micro-organisms must be verified authentic prior to use to ensure the protection of all other users and staff.

Any user found not adhering to this lab usage agreement will be deemed to have committed a "**deliberate act of non-compliance**" to the Nanolab Microbiological lab safety statement and all access to the facility will be terminated with immediate effect.

Sharps waste

All sharps waste such as needles, disposable scalpels, broken glass etc must be disposed of in the yellow 'Sharpak' bins provided in each cell culture room and in the main RESC laboratory. When full, these bins must be closed properly with the safety closure button and tagged with the same tags as used for the yellow bags. Again these tags can be traced back to the laboratory so care must be taken in ensuring that these bins are used correctly.

Reporting on needle injuries
There is a 6-30% risk of hepatitis B infection and a 0.6% risk of HIV infection following from exposure to needle injuries in unscreened samples. In most cases, biological samples sent to the RESC laboratory are screened, but safe use of needles must be carried out at all times.

- Double gloves must be worn with protective clothing
- Needles must not be recapped, bent or broken after use
- Needles must be disposed of carefully in the sharps bins provided.

All needle injuries must be reported at once to the laboratory technician or to a senior staff member and a doctor/nurse seen within 48 hours of the accident.

Incorrect use of laboratory equipment

Incorrect use of laboratory equipment such as centrifuges, laminar flow hoods, cell culture incubators, Coulter counters, pipettes etc can be a potential hazard to the user. All equipment must be handled with care and each researcher must receive full training from the laboratory technician or a senior staff member before attempting to use the equipment to ensure that correct operating and cleaning procedures are implemented.

Risk and Safety Phrases

Risk Phrases	Risk Phrases
R1 Explosive when dry **R2** Risk of explosion by shock, fire or other sources of ignition **R3** Extreme risk of explosion by shock, friction, fire or other sources of ignition **R4** Forms very sensitive explosive metallic compounds **R5** Heating may cause an explosion **R6** Explosive with or without contact with air **R7** May cause fire **R8** Contact with combustible material may cause fire **R9** Explosive when mixed with combustible materials **R10** Flammable **R11** Highly flammable **R12** Extremely flammable **R14** Reacts violently with water **R15** Contact with water liberates highly flammable gases **R16** Explosive when mixed with oxidizing substances **R17** Spontaneously flammable in air **R18** In use, may form flammable/explosive vapour-air mixture **R19** May form explosive peroxides **R20** Harmful by inhalation **R21** Harmful in contact with skin **R22** Harmful if swallowed **R23** Toxic by inhalation **R24** Toxic in contact with skin **R25** Toxic if swallowed **R26** Very toxic by inhalation **R27** Very toxic in contact with skin **R28** Very toxic if swallowed **R29** Contact with water liberates toxic gas **R30** Can become highly flammable in use **R31** Contact with acids liberates toxic gas **R32** Contact with acids liberates very toxic gas **R33** Danger of cumulative effects **R34** Causes burns **R35** Causes severe burns	**R36** Irritating to eyes **R37** Irritating to respiratory system **R38** Irritating to skin. **R39** Danger of very serious irreversible effects **R40** Limited evidence of a carcinogenic effect **R41** Risk of serious damage to eyes **R42** May cause sensitisation by inhalation **R43** May cause sensitisation by skin contact **R44** Risk of explosion if heated under confinement **R45** May cause cancer **R46** May cause heritable genetic damage **R48** Danger of serious damage to health by prolonged exposure **R49** May cause cancer by inhalation **R50** Very toxic to aquatic organisms **R51** Toxic to aquatic organisms **R52** Harmful to aquatic organisms **R53** May cause long-term adverse effects in the aquatic environment **R54** Toxic to flora **R55** Toxic to fauna **R56** Toxic to soil organisms **R57** Toxic to bees **R58** May cause long-term adverse effects in the environment **R59** Dangerous for the ozone layer **R60** May impair fertility **R61** May cause harm to the unborn child **R62** Possible risk of impaired fertility **R63** Possible risk of harm to the unborn child **R64** May cause harm to breastfed babies **R65** Harmful: May cause lung damage if swallowed **R66** Repeated exposure may cause skin dryness or cracking **R67** Vapours may cause drowsiness and dizziness **R68** Possible risk of irreversible effects

Chemical Storage & Compatibility

Following are general guidelines for compatibilities of several chemical groups. This list is not meant to be all-inclusive or cover every possible combination. Contact EH&S if you have any specific compatibility issues or if unsure which chemicals can be safely stored together.

CHEMICAL GROUP	**INCOMPATIBLE WITH:**
Flammable solvents (xylene, toluene, benzene, ethyl benzene, etc)	Caustics, acids (with the exception of acetic acid which should be stored along with flammables), oxidizers
Inorganic acids, non-oxidizing (sulfuric, hydrochloric, phosphoric acids, etc.)	Caustics, flammables, cyanides, sulfides, most halogenated and non-halogenated organics, reducing compounds, peroxides
Inorganic acids, oxidizing (nitric, chromic acids, etc.)	Organic acids, flammables, caustics, cyanides, sulfides, most halogenated and non-halogenated organics, reducing compounds, peroxides
Organic acids (formic acid, etc.)	Inorganic acids (oxidizing), flammables, cyanides, sulfides, caustics, most non-halogenated and halogenated organics
Oxidizers (sodium nitrate, potassium nitrate, etc.)	Organics, inorganic acids, organic acids, reducers
Water reactives (sodium metal, lithium, etc)	Water, should be stored separate from all other chemicals
Cyanide and sulfide compounds	Inorganic and organic acids
Ammonia	Bleach, acids, organics
Halogenated solvents (chloroform, carbon tetrachloride, trichloroethylene, etc.)	Acids, caustics, oxidizers

Appendix 6

FOCAS Research Institute Trip / Fieldwork

FIELDWORK RISK ASSESSMENT

The purpose of this risk assessment is to identify possible causes of harm and measures needed to avoid these - before an accident occurs.

A **hazard** is anything with the potential to cause harm. The **risk** is the likelihood that someone will be harmed by the hazard and the severity of the harm caused. A high risk is one which is very likely to occur and/or may cause death or serious injury/illness. A low risk is extremely unlikely and/or would result in trivial or no injury/illness. A medium risk is in between these two.

By carrying out a risk assessment, you can direct attention and resources where they are most needed to prevent injuries or ill health.

The five steps to carry out a risk assessment are :

1. **Identify the hazards** - find out about the site, the work, where you will be staying, how you will be travelling etc. Contact your School Safety Officer and/or Head of School for documentation on Health and Safety policies.

2 **Identify who might be harmed and how** - think about risks to yourself and others in your team. People with health problems, disabilities or lacking experience in fieldwork may be at greater risk and need extra protection. Think about harmful effects of your work on the environment and how these can be minimised.

3. **Evaluate the risks and consider how the risk of harm can be reduced** - what arrangements, equipment and training etc. will help to avoid accidents or illness?

4. **Record your findings** - on the risk assessment form overleaf. This assessment should form the basis of safe working practices and local rules. Don't just fill in the form and forget it - make sure everyone in your team knows about the risks and how to avoid them.

5. **Review and revise your assessment where necessary** - you should do this when there are significant changes in materials, equipment, work methods, location or people involved. Assessments should also be reviewed if there are accidents, near misses or complaints associated with the work.

** **NOTE**: If the risk of biological and/or chemical hazards is high, you should carry out a separate risk assessment and record the results on biological agents (section 12) and/or hazardous chemicals risk assessment forms (section 11). Risk assessments are also needed for any laboratory work using hazardous chemicals or biological agents collected on field trips.

SECTION 14

FIELDWORK RISK ASSESSMENT FORM

14.1 Researcher Details	
Name (use block capitals): Title: Faculty/ School/Department:	
14.2 Location(s) of Work	
[Please type here]	
14.3 Title and Description of fieldwork e.g. independent student project/ research	
14.4 Proposed time-scale for completion of research	
Dates: From: To:	
14.5 Hazards	
14.5.1 Physical hazards **e.g. extreme weather; mountains and cliffs; quarries, marshes and quicksand; freshwater or seawater**	***RISK*** **(High, medium, Low)**
1. 2. 3. 4.	

5. 6.	
14.5.2 Biological hazards E.g. Poisonous plants; aggressive animals; soil or water micro-organisms; insects.	***RISK*** (High, medium, low)
1 2 3 4 5 6	
14.5.3 Chemical hazards E.g. pesticides; dusts; contaminated soils; chemicals brought into site.	***RISK*** (High, medium, low)
1. 2. 3. 4. 5. 6.	

14.5.4 Man-made hazards E.g. Electrical equipment; vehicles; insecure buildings; slurry pits; power and pipelines.	***RISK*** (High, medium, low)
1. 2. 3. 4. 5. 6.	
14.5.5 Personal safety e.g. lone working; attack on person or property	***RISK*** (High, medium, low)
1. 2. 3. 4. 5. 6.	
14.5.6 Environmental impact e.g. Rubbish; pollution; disturbance of eco-system	***RISK*** (High, medium, low)

1. 2. 3. 4. 5. 6.	
14.5.7. Other Hazards (specify)	***RISK*** (High, medium, low)
1. 2. 3. 4. 5. 6.	
14.5.8 Steps taken to minimise risks identified above e.g. procedures; equipment; clothing; skills training; information	

1.

2.

3.

4.

5.

6.

14.6 Emergency procedures

e.g. first aid; survival aids; communication

1.

2.

3.

4.

5.

6.

14.7 Sources of information used for this assessment

1.

2.

3.

4.

5.

6.

14.8 Have the following been arranged for?

Please answer yes, no or not applicable (NA)

1) Suitable travel arrangements and licensed drivers: **Answer:**
2) Adequete insurance cover: **Answer**:
3) Permission to work on site: **Answer**:
4) Necessary training and information received: **Answer:**
5) Health and next of kin information given to field trip leader: **Answer**
6) Provision for disabilities, health problems: **Answer**

14.9 Person(s) completing this assessment :

Signature: _____ **Print Name:** _____ **Title:** _____ **Date:** _____	**Signature:** _____ **Print Name:** _____ **Title:** _____ **Date:** _____

14.10 Approved by Safety Officer (or Head of School)

Signature: _____ **Title:** _____

Print Name: _____

Date: _____

14.11 Approved by Head of School

Signature: _____ **Title:** _____

Print Name: _____

Date: _____

Appendix 7

FOCAS Research Institute Generic Health and Safety Forms

OUT OF HOURS WORK GENERIC FORM

This form should be completed by a competent assessor for any procedure/system of work to be carried out "out of hours" by any staff member, postgraduate, contractor or visitor. This form should be completed and copied to the Health and Safety Officer.

Activity being assessed	
Name of Assessor	
Known or expected hazards associated with the activity (note also particular hazards if any due to lone working)	
Training required?	
Personal Protective Equipment required?	
Competent "Buddy" required?	
Emergency action to be taken out of hours?	In the case of a *minor* incidence: (i) Neutralise the cause of the incidence (ii) Take local action immediately for minor personal injuries (iii) Fill out an incident report form In the case of a *serious* incidence: (i) Neutralise the cause of the incidence (ii) Move injured parties if possible to safety and evacuate area (iii) Alert emergency services (dial 0 112
Arrangements for evacuation?	A continuous alarm will sound All staff present act as wardens (i) Secure area by turning off appliances and closing doors and windows, if possible. (ii) DO NOT TURN OFF LIGHTS (iii) Leave are without delay (iv) Proceed to nearest clear exit (v) DO NOT USE LIFTS (vi) Assemble at the designated assembly point B (Back gate of Kevin St site) (vii) DO NOT RE-ENTER UNTIL INSTRUCTED

Risk Category A ☐ ☐ **X** D ☐	

Request by Supervisor ***I request that the following person, be given permission for out of hours access in this category. I have discussed the work and completed a risk assessment for the task.***	***Signature of Supervisor*** **Name:** **Date:**

RISK ASSESSMENT GENERIC FORM

RISK ASSESSMENT

Exact Location:	**Activity:**	**Date:**	**Date for Review:**
Assessors:			
Information referred to: (manuals, safe work practice sheet, policies, procedures, incident stats etc)			
Staff consulted:			
Number of people exposed & frequency of exposure:(office staff, maintenance personnel, contractors, cleaners, members of the public, visitors, inexperienced staff, lone workers, technicians, students, lab aids, lecturers, people sharing the workplace etc.)(routinely/daily/weekly/rarely)			

List hazards based on the sequence of work elements/structural environment/plant & equipment etc.

Number	**Hazard**	**Risk**	**Recommended Action/ Control Measure(s)**	**Risk Rating**	**Timescale/ Target Date**	**Person(s) Responsible**

CHEMICAL RISK ASSESSMENT GENERIC FORM

DIT Chemical Agents Risk Assessment as required by the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2010)

Department assessment no.
Location (Department & labs where activity will be carried on):
Date:
Title of work/project:
Assessment carried out by:
Date for review:

Substance name	*CAS no*	*Conc*	*Amount used*	*Hazard ID*	*Hazard Statement*	*Route of exposure*	*Frequency and Duration of use*	*Precautionary Statement*	*OEL*

Conc = concentration (%,N ,M, ppm etc))
OEL = occupational exposure limit as set down in the most up to date Code of Practice for the Chemical Agents Regulations

Frequency of Use	**Indicative Criteria**
Occasional	Use averaging less than 2 hours per week over an extended period or use on a small number of occasions (less than 10) after which use will cease
Frequent	Regular daily use for 1-2 hours per day or less or Regular use for several hours on one or two working days per week
Continuous	Use for several hours per day on all or a majority of working days

Note: *Waste and products of reaction must also be listed*
MSDS must be appended.

2. Circumstances of work involving the chemical agents

The procedure is set out in a lab manual (please reference)

Safe system of work/protocol incorporating safety instructions; either summarise below or give reference to an attached document: *The safe system of work is a statement of how the work activity is going to be carried out safely. It should specify the ways in which the hazardous substances are to be used or handled, and should give sufficient details to identify the precautions necessary to control the risks that arise from working with the hazardous substances.*

3. Storage and Transport
Where are substances stored (lab or designated store)?

Does storage of the substances or movement of the substances within the building contribute to the risk?

4. Disposal of Waste.
Disposal of waste hazardous substances will be done by one of the following methods.

Flushing to drain after rendering harmless to persons or the environment*	
To general waste collection after rendering harmless to persons or the environment* Please state how the waste is rendered harmless	
Via the School's disposal service:	
Specify any other disposal method	
Does disposal of waste contribute to risk? YES/NO	

5. Personnel exposed
Numbers of undergraduates

NAME	Staff/ Postgraduate/ Postdoctoral researcher

6. Persons not directly involved in the work activity who may be exposed.

Identify any persons in the following groups, not directly involved with the work activity, that may be at risk from the hazards of the activity.

Academic staff		Technical staff		Postgraduate students	
Undergraduate students		Maintenance staff		Secretaries	
Cleaning staff		Emergency personnel		Contractors	
Visitors		Laboratory attendants			

Persons identified above may require to be informed of the information contained in this risk assessment.

7. Preventative or control measures currently in place

Specific Training given (eg safety instruction given at start of practical)

8. Engineering Control Measures

The work can be carried out safely on the open bench		
The work must be carried out in a fume cupboard(s)		
Where engineering controls are used e.g. fume cupboards, LEV, etc. are these subject to a formal performance test, at least every 12 months, and records kept? *If no, this must be arranged.*	Yes	No
Is air monitoring required to ensure that the control of exposure to the hazardous substance(s) is adequate?		

9. Personal Protective Equipment (PPE)

If adequate control of exposure to the hazardous substance(s) cannot be achieved by substitution or engineering controls the following type(s) of PPE will be required for part or all of the activity.

Eye protection		Face protection		Hand protection		Respiratory protection	

Specify the grade(s) of PPE to be worn:
Specify when during the activity the item(s) of PPE must be worn:

10. Activity where there is a foreseeable potential for significant exposure

List any activities such as maintenance of equipment, spillage etc where there could be significant exposure (remember spillage of small amounts may not lead to significant exposure).

11.Emergency Procedures.

State procedures in the event of a spillage or reference them from safety statement.

Are there special first aid measures required in the event of exposure? Yes/No

If yes please outline below.

12. Risk Assessment

Risk assessment is based on the likelihood or probability of a person or persons being exposed to a chemical or chemicals, combined with an estimation of how harmful the outcome of the exposure would be to a person or persons.

likelihood of exposure / *result of exposure*	**Highly unlikely**	***Unlikely***	***Likely***
Slightly harmful	Insignificant risk	Low risk	Medium risk
Harmful	Low risk	Medium risk	High risk
Extremely harmful	Medium risk	High risk	Unacceptably high risk

Taking into account the information you have gathered and the control measures or preventative measures that are currently in place, what is your estimation of the risk.

Risk Assessment with current control measures in place =

13. Additional control measures required to reduce the risk

If the precautions specified in this form do not adequately control the risks of handling the hazardous substances please specify below the additional precautions required. Work must not commence until the risk has been reduced to the minimum ***reasonably practicable*** level.

Additional precautions may include additional training, warning signage, PPE

1	
2	
3	
4	
5	
6	

Health Monitoring

Is occupational monitoring required to ensure that the control of exposure to the hazardous substance(s) is adequate?		
Is health surveillance required for the protection of the health of employees?		

If yes, this should be arranged via the Safety Office

Risk Assessment when additional control measures are put in place =

14. Risk Assessment Approval

If the risk assessment is completed in conjunction with a postgraduate or 4th year student the supervisor must review it and sign below

Supervisor
Date ___/____/____